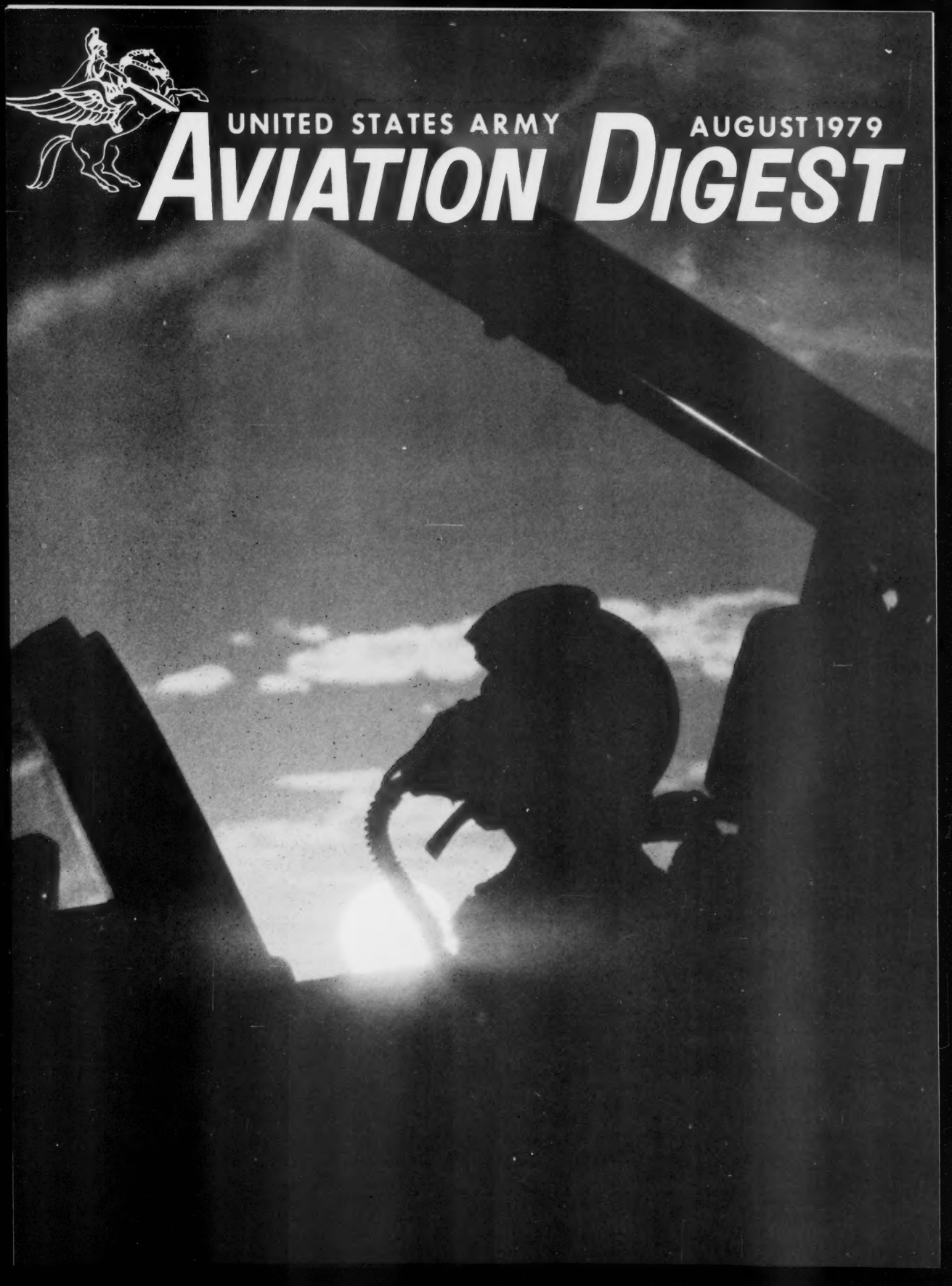

UNITED STATES ARMY

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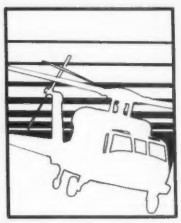
page 6



page 14

1 **U.S. Army's Astronaut,** LTC Richard L. Horvath
6 **Self-Deployment of CH-47 Medium Lift Helicopters to Europe,** LTC James B. Thompson
8 **Flight Simulator Reflections,** MAJ Louis Scipioni Jr.
12 **Survival Is Life—Before and After,** SGT Charles H. Jackson III
14 **DES Report To The Field: Weight & Balance**
16 **The Threat: Soviet Airmobile Operations**
17 **Space Shuttle Orbiter Columbia,** Ruth Jackson
18 **A Professional Look at Professionalism**
21 **When Go Should Have Been No-Go!**
22 **Put It Down; Leave It Down**
24 **What's New In Aviation Training Literature**
27 **EPMS Corner: Personnel Changes At Branch,** SFC Douglas E. Allen
28 **Tactical Instruments: Close Encounters Of The Meteorological Kind,** MAJ Bruce S. Beals
31 **Views From Readers**
32 **Shipping Helicopters,** SP4 Bill Branley
34 **National Guard Aids Injured Hunter,** SP5 Dail M. T. Adams
38 **Reporting Final**
40 **PEARL's**
42 **What Is Night Flight Off-Center Vision?** CW2 Robert L. Portman
44 **Tracking And Balancing Helicopter Blades,** Claud C. Ruthven
47 **OPMS Corner: Grading of Warrant Officer Positions,** MAJ Taylor C. Harvey
48 **ATC Action Line**
Inside Back Cover: **You, The News Media And Aircraft Accidents**

page 21

page 28

page 40

Richard K. Tierney
Editor

Cover: **Major Robert Stewart, the Army's astronaut and the subject of this month's cover story, prepares for an early morning flight at NASA's Johnson Space Center near Houston, TX. The story begins on page 1. (Cover photograph by SP4 Manuel Gomez)**

The mission of the ***U.S. Army Aviation Digest (USPS 415-350)*** is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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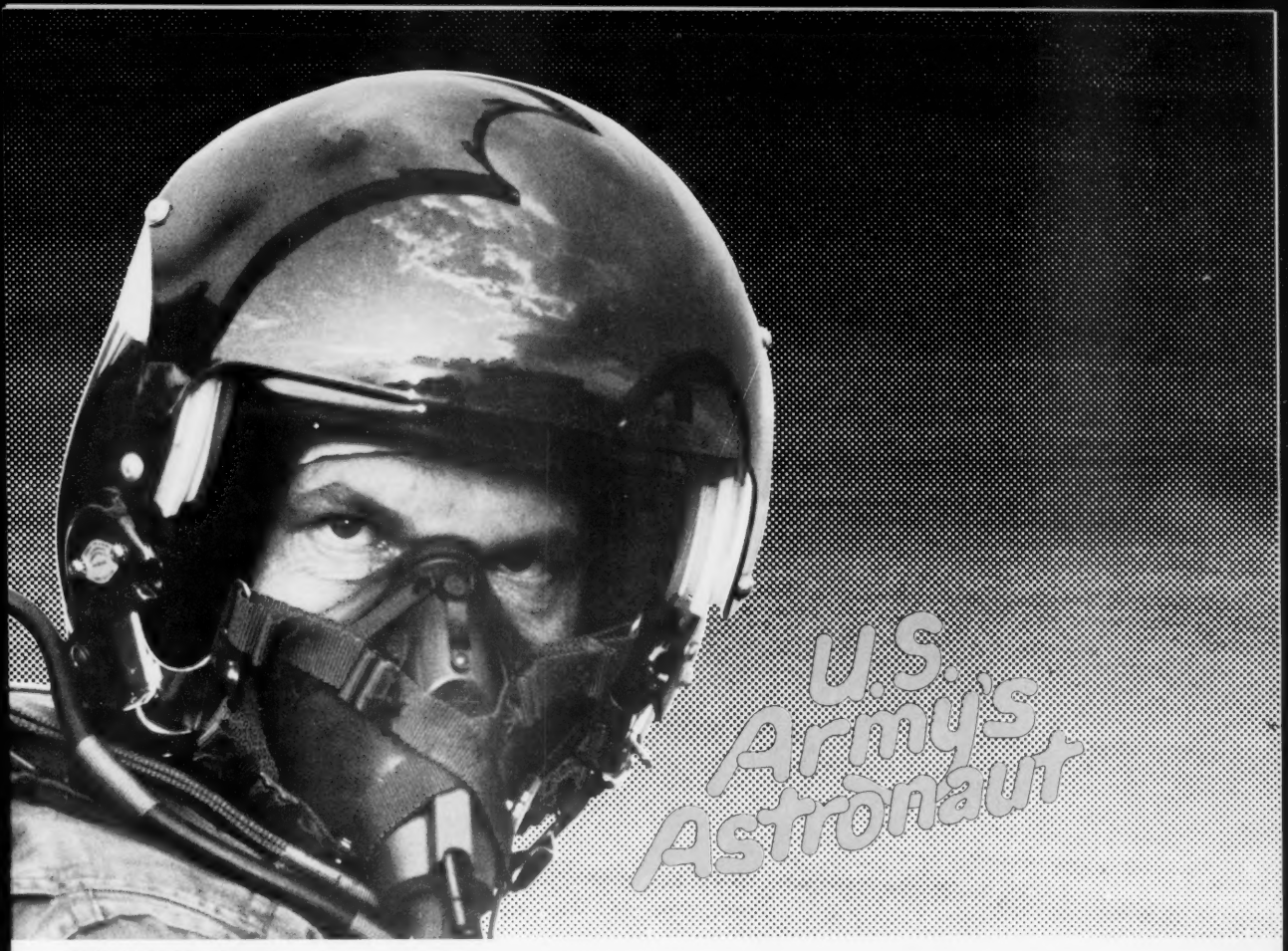


U.S. Army's Astronaut

Major Robert L. Stewart

LTC Richard L. Horvath
Command Information Division
Office of The Secretary of the Army
Washington, DC

Photography by SP4 Manuel Gomez

AVIATION HAS come from flying at Kitty Hawk to piloting the Concorde—from nap-of-the-earth flying to outer space — and space is the next step for Army aviation's Major Robert L. Stewart.

MAJ Stewart, an Army aviator, is one of 35 astronaut candidates selected by the National Aeronautics and Space Administration (NASA) to train as a mission specialist for NASA's space shuttle program. The 37-year-old pilot, who has logged more than 4,200 hours in 38 different aircraft, will be responsible for satellite development, retrieval operations, payload oriented extravehicular activities and experimental operations while in space.

For Bob Stewart it was not an easy road to NASA's Johnson Space Center at Clear Lake, TX, 25 miles southeast of Houston.

MAJ Stewart started his flying career in 1960 while in high school, as a jack-of-all trades for English Flying Service in Hattiesburg, MS. At Southern Mississippi University, Bob pursued a degree in mathematics, while continuing his flying — fire patrols, power line inspections, charters and flight instruction.

Following graduation, commissioning through the ROTC program and his first assignment with 32d NORAD Region Headquarters, Bob completed helicopter training at Ft. Wolters, TX and Ft. Rucker, AL.

Then came a tour in Southeast Asia where he logged 1,000 combat hours as a fire team leader in an armed platoon of an assault helicopter company. He earned three Distinguished Flying Crosses, a

Bronze Star Medal, 33 Air Medals, the Army Commendation Medal and two Purple Hearts as a result of his Vietnam service.

MAJ Stewart returned to Ft. Wolters as a helicopter instructor and then went to Ft. Bliss, TX to attend the Guided Missile Systems course. ". . . like a 4-year engineering degree stuffed into 30 weeks," he said, ". . . a certain percentage of people are given the opportunity to go on for an advanced degree . . . I was one of those people."

Bob, his wife Mary, whom he married in 1963, and daughters Ragon (1965) and Jennifer (1968) were sent to Arlington, TX, where Bob attended the University of Texas — Arlington (UTA). "I think the reason was UTA was concentrating on low-speed aerodynamics — helicopter aerodynamics — which was what the Army wanted," he said.

"My primary instructors were outstanding," MAJ Stewart recalls. "Don Seath and Jack Fairchild could 'stick and rudder' with somebody like me or discuss equations with someone theoretically oriented."

Following a tour in Korea, the astronaut candidate continued his desire for flying and was accepted into the U. S. Naval Test Pilot School at Patuxent River, MD. After graduation, he was assigned to the Army element at Edwards AFB, CA, as an engineer test pilot.

"Edwards was a good tour," he recalled. ". . . flew in two utility and two attack helicopters the Army was testing at Edwards." It was there that Bob decided he met the qualifications for training as a space shuttle crewmember and applied. But it wasn't quite that easy.

The Army alone had 180 applicants competing for the 35 NASA slots. MAJ Stewart made the first cut of 33 the Army recommended and was one of the seven Army applicants NASA called to Houston for final interviews. That alone was a significant accomplishment considering there were more than 8,000 applicants.

ABOVE: Army Major Robert Stewart works in glove fit exercise in a negative pressure device at Johnson Space Center

BELOW: The Army's only astronaut candidate inspects sleeve assembly of the shuttle space suit in the Johnson Space Center

BELOW RIGHT: Major Stewart packaging his suit

Looking back on those interviews and the testing at Johnson Space Center, Bob recalls thinking, ". . . what am I doing here? Everyone in the final group of 207 candidates seemed more qualified than I was."

But finally on 16 January 1978 — a year after he forwarded his application—MAJ Stewart was informed that he was one of the 35 "new guys." His reaction was echoed by his 34 companion candidates last January when they held their first annual "Who Me?" party.

The 35 "new guys" include 14 civilians, 10 Air Force, 9 Navy, 1 Marine and MAJ Stewart, the Army's only astronaut. Of the 35, six are women, three are black and one is oriental.

What about the 35 "new guys" at Johnson? How did the older, more experienced astronauts view the fledglings? What was their regimen after coming on board?

Bob related, "They were really glad to see us here — someone to share the work load with. There is a lot to do in preparation for the first shuttle flight in 1980.

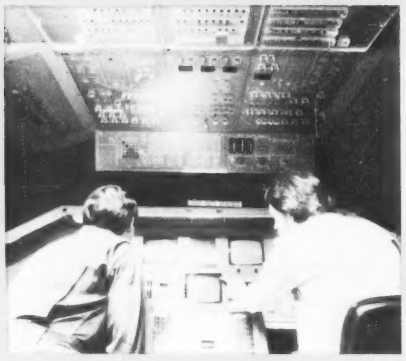
"Our first 3 months were extensive in academics. We normally spent a full 8-hour day on everything from NASA organization to the shuttle system. We also had such short subjects as geology, astronomy and material science," he recalled. "Our biggest emphasis now is our own projects." But the regimen is not restricted to academics. Bob maintains proficiency in the art of flying high performance aircraft by logging time in the T-38 supersonic jet trainer.

Major Stewart working with NASA engineers on shuttle problems at Johnson Space Center

MAJ Stewart's project is to monitor development of the reentry flight control system. Reentry is complicated by the fact that there are two control systems — one for space and one for earth's atmosphere. "We start out at about 150 miles in a space environment," he said, "but you really don't enter a sensible atmosphere until the 75-mile level. So you control with jets and phase in aerodynamic controls."

He spoke candidly concerning qualifications of future Army candidates, "Look for a broad background. Selection should never be on records alone. The candidate should not be overly specialized. Experience in the problem solving process is paramount. Do not sacrifice experience for a Ph.D. A solid master's degree is suitable. An important factor is the psychological compatibility to work with other people for 30 days or longer in a space vehicle."

Major Stewart contemplates the future.
Mockup of space shuttle in background
INSET: Bob trains in shuttle simulator



As for more Army candidates, the U. S. Army Military Personnel Center has stated that for the first time, applications from the Army National Guard and the U. S. Army Reserve, as well as the active Army, will be encouraged.

The term 35 "new guys" is a self-coined title the astronaut candidates have adopted. It appears on a blue and white T-shirt depicting a shuttle and 35 caricatures of astronauts in varying degrees of symbolic work in and around the shuttle. Below the space craft is the abbreviation TFNG (thirty-five new guys) and their slogan, "We deliver."

Perhaps a good omen, the Stewart's home was first owned by astronaut Thomas Stafford, now an Air Force Lieutenant General and Deputy Chief of Staff for Air Force Research, Development and Acquisition. Stafford was in the second group of astronauts to participate in space operations. "If these walls could only talk," MAJ Stewart said.

A set of unique aviation wings sit on one of the shelves in MAJ Stewart's living room. This set shows a shooting star through a ring and is the official astronaut insignia. Bob says, "I won't pin them on until I return from my first flight." The wings were presented to MAJ Stewart shortly after his selection to the program by MSGT Martin D. Wright, a quality control NCO in the Army element at Edwards.

The whole story of how the Stewarts feel about husband, father and Army aviator standing on the threshold of space is summed up by his oldest daughter Ragon, "It's really cool."

Major Stewart's astronaut wings

ABOVE: Size of the space shuttle is evident in this photograph of Army Major Stewart inside the cargo bay mockup

LEFT: Another view of the space shuttle trainer

LTC Richard L. Horvath is Chief, Print Media Branch, Command Information Division, Office, Chief of Public Affairs, Department of the Army. A journalism graduate from the University of Detroit, he earned Master's Degrees in management and public administration from Webster College. During a 4-year break in service from 1959 to 1963 he was employed by the Chrysler Corporation Missile Division working as a technical writer and manuals analyst on the JUPITER and REDSTONE missile systems.

SP4 Manuel Gomez was assigned to the Command Information Division, Office, Chief of Public Affairs as a photojournalist. In April he was selected as the Military Photographer of the Year. Since leaving the service in June, he has been a free lance photographer in the Washington area

Self-Deployment of CH-47 Medium Lift Helicopters to Europe

LTC James B. Thompson
Requirements Directorate
ODCSOPS
Headquarters, Department of the Army

SELF-DEPLOYMENT of helicopters to Europe is not a new idea. This has been discussed and tests conducted over water for extended distances, but the concept or idea has never been brought to fruition for reasons too numerous to mention. Now the tides have changed, and self-deployment of Army aircraft to Europe to support mobilization is gaining considerable emphasis and momentum.

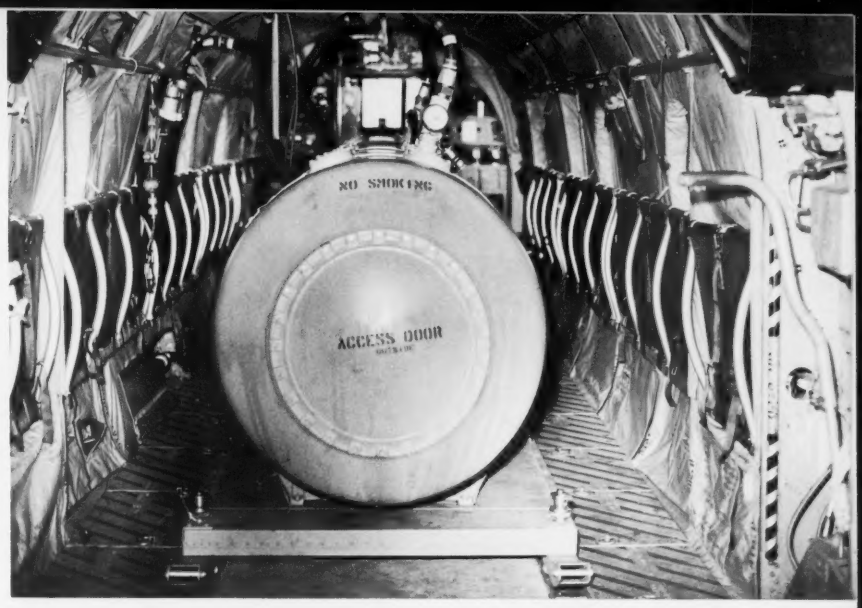
The needed push to go beyond what has been done to date came about as a result of AAPR 1978. The proceedings concluded that because of the critical stress on air and surface transportation assets to transport combat units during the early stages of mobilization, CH-47 Chinook, UH-60 Black Hawk and AH-64 attack helicopters should be self-deployable to Europe, and the means to achieve that capability pursued.

A conceptual study of CH-47C self-deployability conducted by the U. S. Army Transportation School, Ft. Eustis, VA, determined the feasibility of self-deploying Army CH-47C/D models to the European theater from Continental U. S. (CONUS) bases. This study states that the CH-47C with added fuel capability, expanded navigational equipment, and with other requirements which the study identifies, is deployable from CONUS to the continent of Europe. The recommended routes are across the northern part of the Atlantic Ocean with intermediate stops in Canada, Greenland, Iceland and Scotland for fuel and rest.

A Department of the Army (DA) message dated 6 February 1979 tasked Training and Doctrine Command (TRADOC), Army Materiel Development and Readiness Command (DARCOM) and Army Forces Command (FORSCOM) to plan for, test and ultimately self-deploy CH-47Cs and units to Europe. The overall concept outlined in the DA message was directed toward ongoing efforts to expand the medium lift helicopter forward deployed capability in Europe through both increases in the number of helicopters (from 16 to 24) assigned, to the present three units in Europe, and by later deploying the 179th, 132nd and 243rd Medium Lift Helicopter Companies to Europe as directed by Aviation Requirements for the Combat Structure of the Army (ARCSA III).

Under current requirements the

An added safety factor, which makes self-deployment of the CH-47 practical, is its water landing capability



Internal fuel tanks ensure sufficient range for route selection that will enable CH-47C self-deployment

movements of combat and combat support units necessitates that CH-47Cs, together with unit personnel and equipment, be delayed until transportation means are made available. However, the unique resupply capabilities of medium lift helicopters will be urgently required by ground commanders. Their arrival must coincide with that of combat units and ancillary combat power if ground commanders are to have what is rightly theirs, i.e., a viable medium lift helicopter capability that can be depended upon.

The self-deployability of medium lift helicopters and units is critical to winning the first battle and also those that follow. The Army must make sure that this capability is available as soon as possible to ground commanders at all levels. The need is there; something must be done, now!

TRADOC In Progress Reviews (IPRs) of ongoing efforts indicate that the Army will achieve the means to self-deploy CH-47Cs to Europe by the end of fiscal year 1979. This is only to be achieved as a result of the totally dedicated efforts of the TRADOC, DARCOM, FORSCOM and U. S. Army Europe aviation communities. The status of all actions required to achieve the self-deployment objective has been extremely encouraging, especially in light of the short amount of planning and programing time available so far in this major effort.

Well — where are we? Here is what's happening:

TRADOC (The Transportation School) prepared a Draft Concept Evaluation Plan for CH-47C/D Self-Deployability to Europe. Generally, the plan resulted in four CH-47C helicopters deploying to Europe this month to test and validate the concept. The plan identified the flight routes described in the Self-Deployment Study and has specific test objectives, some of which are:

- *Evaluate crew training requirements for self-deployment operations in Europe.*
- *Evaluate performance and characteristics of systems installed in CH-47C aircraft for self-deployment operations.*
- *Provide information on safety and human factors related to self-deployment of CH-47C/D helicopters.*
- *Identify coordination requirements with the other Services and Allied nations for overflight and support during CH-47C/D self-deployment operations.*
- *Evaluate logistical requirements for CH-47C/D self-deployment operations.*
- *Validate flight routes and compatibility of these routes for self-deployability of CH-47C/D aircraft.*

The aircraft were identified, equipment selected, and the scope and context of the test published. The crews for the aircraft consisted of active Army, Army Reserve and Army National Guard pilots. Enlisted personnel came from the 179th Medium Lift Helicopter Company, Ft. Carson, CO. The Canadian Forces also participated in the test. Canadian military personnel have participated in the IPRs conducted to date. They have expressed a strong interest since the Canadian government is faced with the same transportation problem as is the U. S. for its fleet of CH-47s. Their participation and support lends invaluable assistance in this test effort.

Training of crews for special navigation equipment, International Civil Aviation Organization (ICAO) procedures, survival training for overwater flights, cold weather operations, and other required training was completed in mid-July. Thanks to some good luck, "some" money, and continued support from those who have a vested interest in the concept, a flight of four CH-47C helicopters on the 20th of August reported the European coast in sight over the North Sea. At that time, the dream of many Chinook believers was achieved. They realized the personal satisfaction of saying, "I told you it could be done." Concurrently, Army aviation has achieved another milestone. It can report that the means to achieve self-deployment of CH-47Cs to Europe has been validated and that the concept is an effective and time sensitive method for rapid movement of CH-47Cs and their units to Europe.

The opinions expressed in this article are those of the author and do not necessarily reflect the views of the Department of the Army or the U.S. Army Aviation Center

Flight Simulator Reflections

Major Louis Scipioni Jr.
Directorate of Training Developments
Fort Rucker, AL

WITHIN THE NEXT 6 to 8 years the Army will have in excess of one-half billion dollars worth of flight simulators in its inventory. The purchase of flight simulators began in the mid-1960s when the Department of the Army approved a qualitative materiel requirement (QMR) for the development of a synthetic flight training system.

The approval of the QMR lead to the delivery of the UH-1 flight simulator (UH-1FS) to the United States Army Aviation Center (USAAVNC), Ft. Rucker, AL in December 1970. Since that time, the QMR has been updated to include CH-47 flight simulators, AH-1 flight simulators, UH-60 flight simulators and AH-64 combat mission simulators (AH-64 CMS).

The Basis of Issue Plan for these simulators calls for delivery of 22 UH-1FSs, 6 CH-47 FSs, 6 AH-1FSs 9 UH-60FSs and 5 AH-64 CMSs. Currently, 22 UH-IFSs, 1 prototype CH-47FS and 1 AH-IFS have been delivered. These multimillion dollar simulators, under development or in operation, will comprise the most sophisticated helicopter simulator fleet in the world today. The latest technological innovations, which are overwhelming, are incorporated in these simulators.

Despite the technological advances which have been achieved in helicopter simulators, there still seems to be constant criticism in respect to the perceived differences between the flight characteristics of the flight simulators and the actual aircraft. This is rather difficult to visualize considering the astounding capabilities the simulators possess; the simulation expertise possessed by industry; and the simulation expertise of the Army's training device procurement personnel.

Regardless of these credentials, there are perceptible differences in the performance of these devices and the various aircraft they simulate.

During the aerodynamic simulation development and testing, the Army relies on the subjective evaluation of a small group of pilots (one to three). This is a highly subjective procedure and their evaluation reflects only perceived differences between the performance characteristics of the simulator and that of the aircraft. There are a number of problems with this approach.

First, differences that are perceived may not exist as perceived. For example, a pilot might feel that control forces are too high to produce a given roll rate. What bothers the pilot is perception of control force, but the problem may not be one of incorrect control forces at all. It could be that cyclic stick deflections is too little for a given force or that aerodynamic control power is too little. In other words, the pilot can identify what surfaces in sensory perception are a problem, but will likely be unable to identify the source of such problems.

Second, a pilot might identify a problem that is really not a problem at all, or the pilot may exaggerate the extent of a perceived problem. What is happening is that the pilot's memory is not total; the pilot's memory is playing tricks. This is not as far fetched as one might imagine. Doing away with "tweaking" by making direct objective comparisons, however, easily overcomes this shortcoming of the tweaking approach to testing.

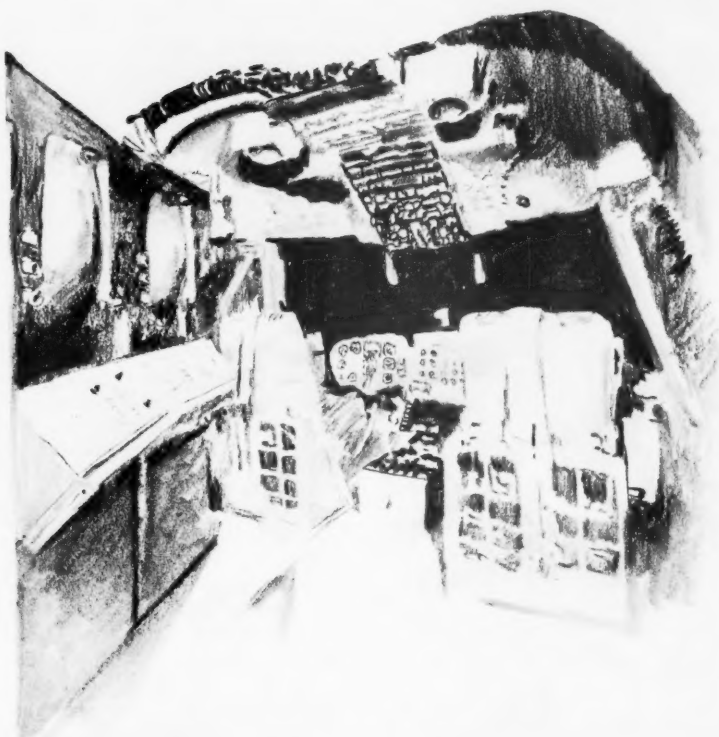
Tweaking is referring to a procedure used in adjusting simulator responses based on subjective evaluations. The adjustments can be made to either hardware or software. In either case, this procedure does not ensure fidelity nor does it ensure the adjustment will not affect other systems simulation. Tweaking does not produce highly repeatable results. The lack of repeatability is due in part to individual differences among pilots and in part to the complex interrelationships of the various facets of simulation.

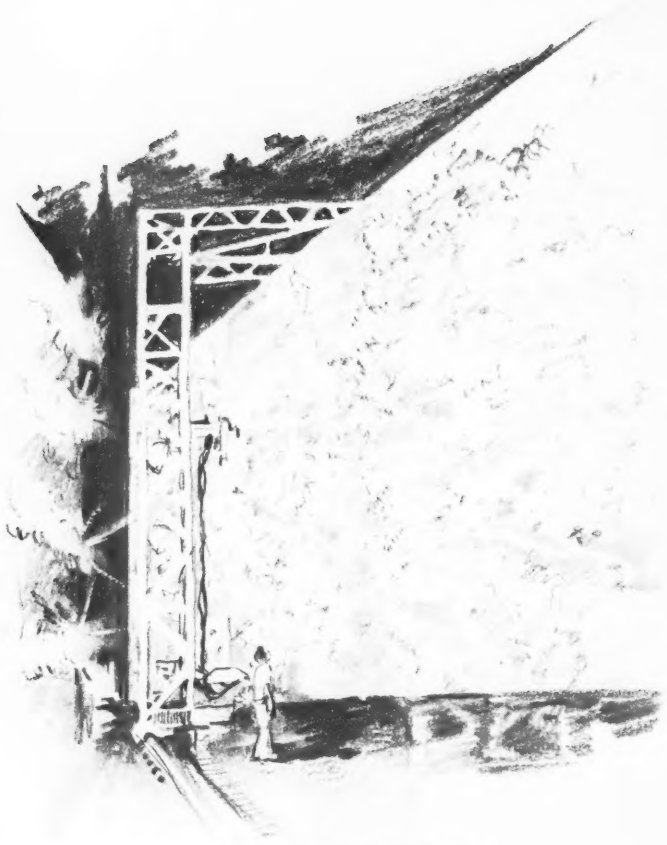
In an effort to ensure high fidelity simulation, the procurement contract requires the contractor to develop an acceptance test plan for use during Government acceptance testing. This plan is submitted to the Government for approval and ultimately is approved. The contractor developed acceptance test plan basically is designed to confirm that the simulator functions identically to the way the Army contract specifications intended it to function and as it was programed. These procedures in no way demonstrate that the contractor's aerodynamic simulation is a high fidelity simulation of the actual aircraft.

There is an attempt to compare actual aircraft measurements or performance values with those being simulated. In most instances engineering or actual flight data are used to develop the aerodynamic simulation, but this will not necessarily assure high fidelity simulation. In order to assure that the contractor's acceptance test procedures are absolute, and the materiel developer's desire to convince the user of the simulator's acceptability, the simulator proponent aviation center is encouraged to develop user acceptance test procedures.

The user test subjects the

Flight simulator cockpit area





Flight simulator terrain board

simulator to various flight profiles in which the user believes the simulator should be capable of performing during training. Naturally, this test is as subjective as is the contractor's. The ironic aspect of the user test is that it is based on the subjective evaluations of the same small group of pilots who assisted the contractor in tweaking the simulator prior to delivery.

Although the present approach to simulator fidelity ensures the Army receives an operational simulator which "seems" to fly like the actual aircraft, we cannot emphatically state whether or not a higher fidelity simulator is required. If simulator fidelity is the issue, then is greater fidelity required in simulators used for the beginning aviator than is needed for the more experienced? Is simulator fidelity critical in certain flight parameters or is it required for total system simulation? Regardless of the perceived magnitude of the simulator "doesn't fly like the aircraft" controversy, we have a greater problem to overcome in respect to flight simulators. This problem is basically how to use them in training.

The first reaction to this is a defensive one with profound statements about how the UH-1FS is providing instrument proficiency to the aviator mass, how the CH-47FS is being used successfully in the CH-47 Aviator Qualification Course, and the envisioned use of the AH-1FS in training. True, they are a success and are cost effective, but we continue to use them in training as a substitute aircraft. We do not approach the flight simulator as a training medium and, therefore, do not reap additional benefits which possibly could be obtained by changing our instructional methodology based on empirical research.

Too many instructional features of the flight simulator lie dormant and are never used. The reason for this lack of use cannot be attributed to the instructor pilot (IP) and the individual aviators. The reason is, frankly, that we don't know how to integrate these features into the training program. Our instructor pilot methods of instructions (MOI) do not teach the IP to use the flight simulator as an instructional tool. It merely teaches the IP simulator operation coupled with additional aircraft MOI. The end result is an IP capable of operating sophisticated flight simulators while using it as a substitute aircraft.

Based on the above contentions, the next defensive reaction is, "We've got to get the training developers on track to revise the program of instruction to eliminate the problem!" Wrong! The training developer does not have the answers either. The training developer can identify tasks for training in the simulator based on the terminal learning objectives. To develop the answers we need, it will require extensive research by agencies which have that capability.

The questions which are being raised are concerned with how and when the capabilities of the flight simulators should be used during training. Present and future flight simulators are and will be capable of automatic demonstrations and instant replay. Should the demonstration feature be used to introduce the tasks or should the instructor introduce the tasks? Which is more effective? What

sequence should be used to introduce the tasks? When should the instant replay be used in lieu of a verbal critique by the instructor? Will the proper use of these features coupled with proper task introduction and sequencing produce a better product at a reduced cost? These questions only scratch the surface of investigative areas, and it will take a long period of research to provide answers.

In the meantime, there are several actions that can be taken to improve the situation. First, we can begin orienting our aviator force to the fact that the flight simulator is an instructional medium and should be treated as such. Second, we can take a different approach to assuring the flight simulator is a high fidelity simulation of the aircraft. The Air Force has developed a new approach to testing simulators, and it would be in our best interest to follow suit. This new approach is called verisimilitude testing.

"Verisimilitude testing is an approach to testing of a simulator that permits determining just how closely the simulator appears to be true or real. In order to avoid the problems inherent in tweaking, the verisimilitude approach to testing has been developed. This approach has both a quantitative side and a subjective side. The objective portion of verisimilitude testing begins with a test plan written to allow extracting data from the simulator that can be compared to available aircraft data. This test plan must be written to take advantage of flight test results from the simulated aircraft."

The subjective portion of verisimilitude testing involves the preparation of a subjective questionnaire and the selection of test subjects. "In order to produce meaningful results from the questionnaire, it is necessary to achieve response repeatability and to eliminate random responses."

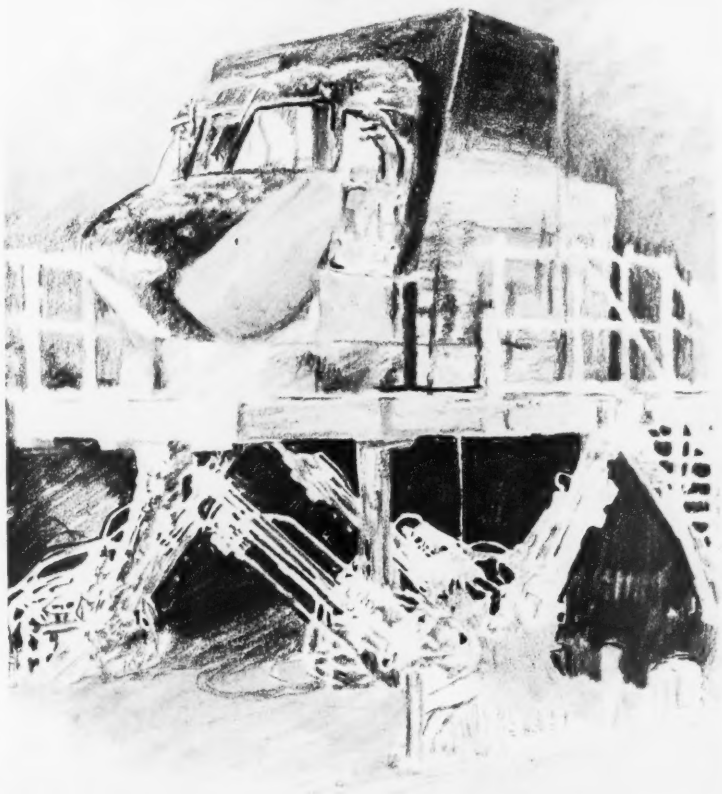
Essentially, verisimilitude testing offers a more objective approach to simulator evaluation. Actual flight data are compared to the simulated flight data of the simulator. As discrepancies are noted, appropriate software changes are executed instead of using the tweaking technique.

In those areas that actual performance values cannot be used or are not available, subjective evaluations are used. In this area, rather than using a small group of pilots that assisted the contractor in developing the simulators, a representative cross section of aviators are used in conjunction with a questionnaire. All of this represents a more effective approach to ensuring simulator fidelity.

It is apparent that the Army has progressed substantially in procurement of sophisticated flight simulators. At the same time, it is apparent that their development and use of flight simulators as an instructional medium have not progressed at the same rate as have technological developments. The progress that has been made has proven to be both cost and training effective, but there are greater strides to be made before we truly maximize flight simulator capabilities.

*Quotes in this article are from a paper presented to the 9th Naval Training Equipment Center Industry Conference in Orlando, FL, by Major James A. Richmond, USAF, on 9 November 1976.

CH-47 flight simulator



SURVIVAL IS LIFE—

BEFORE AND AFTER

SGT Charles H. Jackson III
Troop D, 3rd Squadron, 5th Cavalry
Fort Lewis, WA

AN IDEA. Survival was the main topic of discussion one day in the flight planning room at Troop D, 3/5 Cavalry, Ft. Lewis, WA. The discussion concerned developing a mission that would task all aviators and crewmembers in survival skills while being instructional in nature. The discussion then moved into a plan of action. WO1 Kenneth Johnson, the troop survival officer, and I began scouting for a suitable site for the mission we had in mind.

Wounded crewmember is transported down mountainside in litter made from limbs, boot laces, straps and string

The Cascade Mountains and Mount Rainier National Park provides countless opportunities for survival situations — intentional or otherwise. Our search for a potential survival area took us in and out of the national park. We evaluated several areas, but rejected most as being too unrealistic for instructional purposes. As the unpredictable weather around the semiextinct volcano forced our aircraft back toward Ft. Lewis, we spotted a small glacier-fed lake just below us. Coincidentally it was named Johnson Lake. It was an ideal site.

With the site selected, we began developing survival tasks, emergency backup support and lesson plans for survival classes. The goal was to instill as much authenticity and realism into the training situation as possible. The key was to establish the peak personal challenge while being closely monitored by qualified survival personnel. The challenge was to use one's wits and survive on those items found in the environment and in the standard cold weather survival kit.

Many subjects were prepared for instruction: Building shelters, living off the land, procuring food through fishing and snares, building and maintaining fires, field first aid and transportation by litter, and signaling and associated skills. These preparatory classes were given to the aircrews. Survival techniques were discussed in detail; however, the crews were unaware that they would soon be in an actual survival practical exercise.

Search and rescue is one of the troop missions, so when this mission came down the only unusual aspect was the number of crews required. Eight aircraft crews were alerted, briefed and scrambled. When the crews were prepared to lift off at Gray Army Airfield,

With Mount Rainier in the background survivors fly back to base camp area

selected crews were consolidated into two aircraft. They brought with them the survival gear intended for the original mission. They were lifted to Johnson Lake, dropped off and briefed on the situation they were to encounter.

When we arrived at the base camp at Johnson Lake, the crews were divided into two member teams and assigned to different areas around the perimeter of the lake. Each group was assigned a different intermediate task which included erecting solar stills, snares, signals and shelters. Mr. Johnson and I moved from site to site assessing simulated casualties and instructing the survival efforts as necessary.

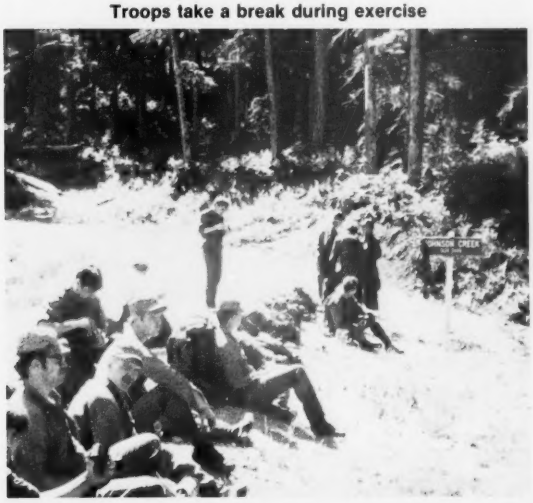
As night closed in around the lake, the survivors began to gather fuel for their fires and upgrade their shelters. The only sounds were the night birds, crackling fires and muffled voice sounds that seemed to carry for miles in the crisp air. Just at nightfall, an OH-58 Kiowa from the troop circled the area of Johnson Lake to ensure that the exercise was still simulated and controlled. Simulating a non-landing area, the pilot indicated that a move had to be made. The simulated rescue pilot gave the survivors instructions on the survival radio administrative frequency, indicating by map coordinates where the pickup was to be made.

With that information, the survivors settled down to their rations — fish, that could be captured or caught from the lake and survival rations — and prepared for a chilly night in the new environment. The night was dark, windy and rain pelted the pine bough shelters we had constructed. A few teams had to reinforce their shelters with additional boughs, but in all the survivors were reasonably protected from the weather.

The following morning the survivors began planning for the move to the pickup area. The simulated casualties were provided transportation by survival litters constructed of limbs, boot laces, straps and string. Backpacks were constructed of similar materials to transport personal gear, leaving hands free for climbing. The move was made across about 2 cross-country miles to the pickup zone. Travel time was about 4 hours. The pickup was completed 30 hours after the first notification of alert.

Survivors gained valuable experience and confidence in their ability to survive in the environment which we all flew over on a daily basis. Additionally, we gained a healthy respect for the impact of the elements and the value of maintaining a cool head. The hour-to-hour existence, learning to be both self-sufficient and to rely on others when required, and surviving in an environment totally foreign, brought an interchange of experiences, skills and opinions which will assist the simulated survivor of this exercise when confronted with the real thing.

Troops take a break during exercise



Lake Johnson survival site

Last month four lines were transposed in the DES article, page 25. The last two paragraphs should have read: Thorough preflight briefing, early demonstration of IP positioning during flight, and elimination of reluctance to take the flight controls should success be in doubt, should result in a significant reduction in accidents involving IP errors.

The above discussion is not intended to assume this to be the only IP mishap problem. On the contrary, it offers one solution directed toward the reduction of aircraft mishaps during flight training. It is emphasized that safety and standardization in training are inseparable in Army aviation. DES would like to hear comments on this subject.

U.S. ARMY
AVIATION
STANDARDIZATION

Directorate of Evaluation/Standardization

REPORT TO THE FIELD

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3617 or commercial 205–255-3617. After duty hours call AUTOVON 558-6487 or 205-255-6487

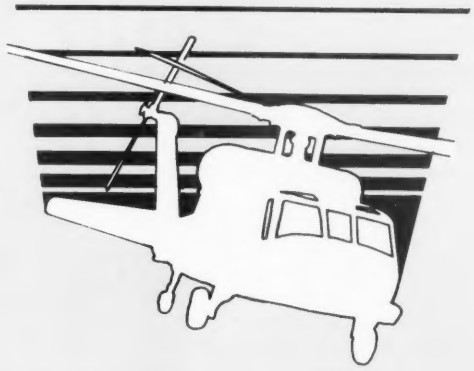
Weight & Balance

ACCURATE WEIGHT and balance information is essential for the safe conduct of all air operations. The pilot in command (PIC) is responsible for ensuring that the aircraft loading arrangement is within allowable weight and center-of-gravity limits. Are you as an Army aviator familiar with all facets of weight and balance computations, and can you apply this data to your particular needs? Commanders and instructors — are weight and balance planning special topics in your training programs?

Let's look at the two parts — weight *and* balance.

- **Weight limits are those imposed by the aircraft operator's manual, modified by atmospheric conditions as they affect aircraft and engine performance throughout all flight profiles.**
- **Balance limits are those imposed by the aircraft operator's manual, modified by the allowable weight and the loading and unloading requirements of the mission.**

Both the weight and the balance must be within specified limitations for the safe flight of an aircraft. Let's look at examples where one of the limits were exceeded, and note the results.



Weight: A helicopter was on a routine supply mission with a 4-man crew, 4 passengers and 25 cases of C-rations. The PIC was at the controls on an approach to a pinnacle. The landing area was cluttered

with stumps and bunkers. As the approach was being terminated to a hover, the copilot informed the PIC that the torque reading was high and the rotor rpm was decaying.

The PIC attempted a go-around, but the left pedal became increasingly ineffective. The helicopter was not able to continue in the intended direction; it spun to the right and downward until impacting in the trees on the side of the pinnacle. On impact, one of the crewmembers was thrown from the aircraft and died en route to the hospital. The remainder of the crew and passenges were injured.

Balance: The helicopter was on a logistics mission to resupply troops in a small confined area which was surrounded by trees. The area was too small to land in so the plan was to hover over the clearing and kick out the supplies. The helicopter was loaded with about 1,000 pounds of cargo, 3 crewmembers and 2 loadmasters. The PIC made a visual reconnaissance of the area and started his approach into a headwind of 5 to 10 knots. As the PIC terminated his approach to a high hover, he noticed that an excessive amount of aft left cyclic was required to maintain control. The PIC applied forward cyclic, regained effective translational lift, and executed a go-around.

Another approach was attempted along the same axis as the first. The PIC advised the crewchief to have the loadmasters ready to kick out the cargo as soon as the aircraft was in position. As the helicopter neared the hover point, the PIC again noticed that an excessive amount of aft left cyclic was required to maintain control. The PIC was unable to stop the aircraft at a hover over the resupply site.

Meanwhile, the loadmasters unbuckled and moved forward to kick out the supplies. This repositioning further aggravated the forward center-of-gravity condition and the aircraft continued its slow movement forward and started an uncontrollable turn to the right. The PIC attempted a go-around; however, the aircraft continued its right turn and slowly settled into the trees.

The PICs in both examples did not display familiarity with weight and balance considerations, or chose not to apply the considerations to their situations. One PIC attempted a mission with his aircraft loaded beyond its weight limits, the other flew an improperly loaded aircraft; the results in both cases were inevitable.

In summary, proper planning, coupled with the knowledge that the aircraft is being operated within its weight *and* balance limitations, will give the PIC the degree of confidence necessary for safe mission accomplishment. Proper weight and balance planning can preclude the needless loss of valuable human and materiel resources.

THE THREAT

Soviet Airmobile Operations

AIRMOBILE operations by Soviet ground forces are a battlefield contingency in the Soviet offensive battle plan that should not be overlooked by opposing forces. Although airmobile operations are not new to the U. S. Army, it goes without saying that one of the first defenders to encounter a Soviet airmobile operation may be the Army aviator. In order to respond effectively, Army aviators should be aware of when, how and where the airmobile operation is likely to take place in the Soviet offensive battle plan.

The Soviets have studied U. S. Army airmobile operations in complete detail. They have determined the balance between the capabilities and limitations inherent in helicopter operations. This has resulted in their acceptance of the airmobile concept into the Soviet ground force offensive battle plan. The ability to quickly concentrate and disperse combat troops and equipment within a large area, unconstrained by intervening obstacles on the ground, is becoming more appealing to the Soviets. They also recognize that the vulnerability of helicopters to air defense systems and air attack by defending fixed and rotary wing aircraft, and the limited payload of helicopters in relation to requirements of the ground combat force limits the size and scope of airmobile operations.

To cover all aspects of airmobile operations, the Soviets have increased helicopter armaments for suppressing hostile ground fire, and have mounted missiles on their helicopters to reduce vulnerability to the aircraft. Additionally, they have installed armor plate at vital points on their combat helicopters and have incorporated other passive defensive measures in aircraft design and battlefield tactics.

The Soviet objective normally is expressed in terms of terrain and/or enemy unit to be neutralized. The objective selected usually will be small, easily accessible and lightly defended. The ground force commander will designate the objective, one or more landing zones at or near the objective, and a departure route for the helicopters.

Ground troops are prepared for embarkation before the arrival of the helicopters in the pickup zone. Ground forces provide the labor force for loading cargo placed 10 to 15 meters from the expected position of the helicopter receiving the load. Personnel to be loaded form a single column at a similar distance and helicopters consuming the most loading time land first. (Final briefing of the troops and flight crews includes recognition signals to be used between units and the place for linkup between friendly forces.) The chief of staff prepares, coordinates and has approved by higher authority a detailed list of what will be loaded into each helicopter.

On arriving at the landing zone, troops depart the helicopter only when permission is given by the helicopter flight crew. Procedures are highly regimented to get the troops, equipment and cargo off the helicopter and away from the loading zone in minimum time. If sufficient landing space is unavailable, troops may exit by using rope ladders or simply jumping.

The airmobile force is organized into two groups —a seizure group and a covering group containing about six platoons (180 troops). Attached to the seizure group and the covering group is a sapper platoon, two platoons of manpacked antitank missiles (six launchers), two platoons of shoulder-fired surface to air missiles, (SAMs), and a section (two guns) from a 23 mm antiaircraft battery. The seizure group and the covering group can be further subdivided in order to land on either side of a water barrier.

The covering group blocks the approach to the seized objective and prevents the enemy from determining the disposition of the airmobile force. This group digs defensive strong points which cover the avenues of approach to this area.

The airmobile operation relies heavily on air and artillery support. However, suppression of enemy forces in the landing area is conducted by the troop carrying helicopter force itself. Because the airmobile unit inserted into the enemy rear area may be attacked from any and all directions, it is likely to require more external fire support than a motorized rifle unit or a similar size force in standard configuration.

Helicopters approaching the landing zone cover each others' off-loading operation with antitank guided missiles, free flight rockets (both antipersonnel and armor piercing) and machinegun fire. The fire power of the helicopters is augmented by the automatic weapons of the troops being transported.

The duration of the mission is determined by the arrival and linkup on the scene of a friendly ground force. (Historical examples suggest that the survival of the airmobile force may not be required for the successful accomplishment of the mission.)

An airmobile operation is but one of many Soviet offensive courses of action considered by opposing forces. It is the responsibility of all personnel in direct or indirect contact with the enemy to understand the complexities of modern warfare on a fluid battlefield. The ability to survive and accomplish your mission as an Army aviator requires a working knowledge of all aspects of the threat. If you do not know *what's happening, where and when*, the element of surprise belongs to the opposition.

Space Shuttle Orbiter Columbia

Unexpected visitor, the space shuttle Columbia, dwarfs visitors at Ft. Bliss, TX, after USACC air traffic controlers assisted in its unscheduled landing there

SP4 RICK M. Kaser, 7th Signal Command air traffic controller at Fort Bliss, TX, recently had the time of his life. He was on duty in the tower when a call came through that the space shuttle orbiter Columbia, securely fastened to the top of a 747 would change course and land at "his" airfield.

"I was so excited," he said. "I wasn't nervous — just excited. It looked 'huge.' You could see it way out. They called from 40 miles away that the flight plan had been changed. Instead of going into El Paso Airport it would be putting down here."

The tower crew had known about the possibility well in advance because the flight plan had been scheduled and changed several times due to weather.

"That was the biggest thing I've ever seen. We landed it on the long runway and it used all but 2,000 feet of that 13,555-foot strip," SP4 Kaser said.

The crew of the orbiter were en route from Edwards AFB, CA to San Antonio, TX, but had to divert to El Paso because of deteriorating weather.

Ruth Jackson
U. S. Army 7th Signal Command
Fort Ritchie, MD

Photo by SP5 Jack Susin

A professional look at professionalism

The following article is adapted from an article written by Cliff L. Stout at Douglas Aircraft. The article, entitled "Professionalism," was distributed to all Douglas Aircraft pilots. It was later published by the International Air Transport Association and recently in AEROSPACE SAFETY magazine. Mr. Stout's comments certainly apply to military aviation. Take a few minutes and give this article your attention.

OKAY, SO EVERYONE wants perfection. Well, no other segment of the transportation industry has ever come so close to it. Yet even the critics must realize that we can only strive for it. And that's where the trouble is. That's what the uproar is about. Are we, you and I and everyone else, really striving for perfection? Or are we sitting on our duffs, settling for considerably less than perfection and just standing by to become a statistic?

If you as a pilot haven't heard the phrase "complacency in the cockpit" in recent months, you must be the only one who hasn't. It's a distasteful phrase, projecting the image of a smug know-it-all who has forgotten about the pitfalls of flying. In so doing he has become one himself. By not constantly trying to do better, to eliminate every chance for an error, he accepts a lowering of his standards and prepares himself psychologically for sub-par performances. This casual approach to a demanding task has unquestionably resulted in the deaths of some of the casual approachers as well as many of the not-so-casual passengers riding behind them.

Professionalism — or the lack of it

The phrase "complacency in the cockpit" seems to imply that the occupants of that space have become so well satisfied with their skill, judgment, excellent equipment, ability to cope and overall superiority that they can let down a bit and still do just as good a job. Like the Boston Celtics playing the Podunk High "B" team. While occasionally this may be true, it is more likely that it overstates the case. Rather than a conscious letdown, what we appear to have is a lack of continuing effort to improve.

Someone sometime advanced the theory that an airline pilot's performance could be graphed. During his career he faces many challenges and, if he is to successfully continue that career, he must rise to meet each one. At the beginning, his level of performance is low, but as he applies himself it rises. After a few years it peaks, levels off, and as self-confidence, perhaps boredom, maybe even dissatisfaction grows, it begins a slow decline.

With a change to new equipment he is challenged again and the cycle is repeated. Upgrading to captain is probably the sternest test and usually

results in the most prolonged climb in the quality of his performance. Eventually it peaks, however, and again decline sets in. One can easily picture such a curve on a graph. Occasionally there will be brief excursions from the norm, minor variations caused by incidents which shocked, scared or otherwise instructed the pilot and resulted in a temporary change of direction. But in the long run the shape of the curve will vary little.

Obviously a far more desirable curve would be one which reflected the normal variations when challenges are met, but did not peak and then decline after a few months or years. Rather it should reach a plateau, not a flat one, but one which slopes slightly upward.

How does one achieve such a performance pattern? By being a full-time professional. You say that's what you are? Then you know why Heifetz still plays scales on the violin, why Jack Nicklaus walks directly from the 18th green to the practice tee, why Rich Little entertains himself for hours doing imitations in front of a mirror. A full-time professional continually seeks to improve by eliminating mistakes.

Preparation for flight — be professional!

Reliance on someone else, whether it be the other pilot, a dispatcher or the Almighty, for a weather briefing or a review of field conditions can be hazardous. The first two might miss something which you consider significant and the third may not be on your side. It's better to arrive early and devote the necessary time to a thorough look at conditions.

You reply, "We're going to go anyway." Maybe and maybe not. Don't assume anything. Get in the habit of making a complete preparation for every flight, regardless of the weather. Then it won't sneak up on you. But it takes a conscious effort to develop the habit. That's what a professional does.

Get to the airplane early, not late. Complete preflight inspections and checklists ahead of time. Last minute rushing causes mistakes and professionals shouldn't make mistakes in anything as simple and basic as checklists.

Preparation for flight also includes being physically ready, maintaining one's health and getting proper food and rest. A pilot reporting for a flight in ill health, insufficiently rested or hung over places an unfair burden on his fellow pilot and jeopardizes the safety of the flight. He is not acting professionally.

Checklists — be professional!

The checklist helps you to make sure that certain things are accomplished, correctly, every time. Both pilots share the responsibility for the completion of the checklist, but the one reading the challenges has the larger share. He must first make sure that he doesn't skip any items. He should consider that the other pilot is doing something besides waiting to hear his dulcet tones. He should be sure he has the man's attention before reading a challenge. And he should read the challenges as they are written, every time. Colorful individual interpretations with rhymes and clever patter thrown in may be enjoyable to the author, but most pilots don't use them. Most use the phrases as written. Hearing something else when you are expecting the standard challenge is distracting, confusing, and leads to errors. The professional way is the right way, the way that eliminates errors.

Communications — be professional!

A professional radio operator knows that "communication" means "the transmission of information" and it implies the reception and understanding of the information. Otherwise it has not been communicated. A professional knows how to communicate most effectively with a minimum number of exchanges. He uses conventional terms and standard phraseology in the proper sequence to eliminate repeating or misinterpretation. He also

observes regulations concerning ATC contacts such as reporting altitude on initial call, reporting leaving altitudes and listening to and reporting the reception of the ATIS.

He does these things because they reduce the repetition of calls and they eliminate errors.

Precision — be professional!

With the equipment now at our disposal, precision flying is easier than ever before. Witness the few missed approaches in two hundred and one-half weather. But precision flying shouldn't be limited to approaches. The airways should be flown just as precisely.

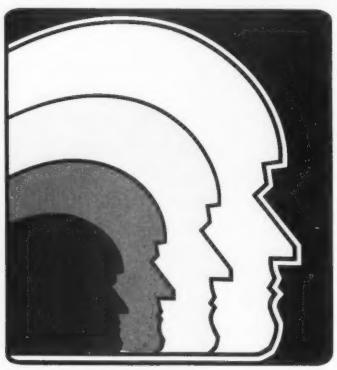
A professional doesn't do anything in an amateurish way. We, as professionals, should fly exactly on course and exactly on altitude. No one enjoys having ATC broadcast to him and the rest of the world that he is 5 miles off the centerline. A professional is precise, too, in following standard operating procedures, observing speed restrictions and operating limitations without the presence of a check pilot to inspire him. A professional doesn't need a check ride.

What else makes up professionalism?

Years of experience teach a pilot so many things that a catalog of them would fill volumes. However, certain general topics emerge which can be discussed in a few paragraphs.

Beginning with "A" for no particular reason, we think of "alertness." Whereas a pilot's attention used to be focused on keeping the wings level, maintaining altitude and course and "keeping his head on a swivel," now the autopilot flies the airplane and radar controllers point out traffic. We hope. Is hope enough? Not enough for a full-time professional. He spends his time monitoring instruments and looking around.

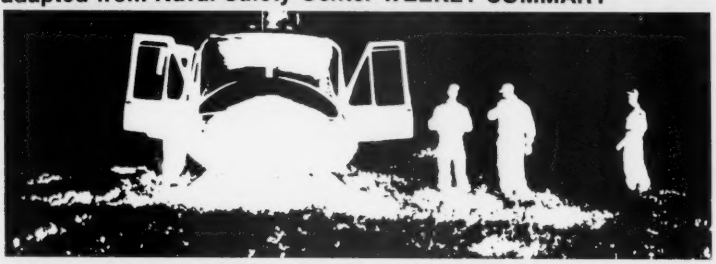
Being constantly aware of exactly where one is in relation to airways, outer markers, airports and most important, the ground, is another form of alertness. In these days of almost continual radar vectoring, complete reliance on an outside agency for navigational guidance is the easy way, but it can lead you down the garden path or up the proverbial creek. It is not the professional way. Healthy skepticism of a radar controller is not an insult to his ability; it is a tribute to your professionalism.



The responsibility shouldered by an airline pilot when he departs on a flight is awesome. Acceptance of responsibility these days is unusual. Thus the airline pilot becomes unusual. People expect more of him. This becomes an additional responsibility, a responsibility to conduct himself at all times in a way that is a credit to him and to his colleagues, in a way that moves people to look up to him, not sideways, or even down. His high professional standards should be carried over into his personal standards. In a job that is of necessity largely unsupervised, his personal integrity must be unquestioned. Cheating should never occur to him. His reports of "on, in, out and off" times should be just as precise and exact as his ILS approach with 1800 RVR. The pilot who doesn't meet these standards damages his own reputation and those of his colleagues.

A cockpit organized along highly professional lines will never have room for complacency.

adapted from Naval Safety Center WEEKLY SUMMARY



When go should have been no-go!

RECENTLY, ON a helicopter flight, the pilot heard a "bang," noted that the transmission chip light illuminated, and made a precautionary landing in a farmer's field 15 miles from his destination. After a cursory external examination of the helicopter in which no additional visible conditions were noted by the crew, the pilot took off again and continued to his destination with the chip light still glowing. Postflight inspection revealed four of the five transmission system segment chip lights located behind the transmission access panel were illuminated. Metal chips were found on the chip sensors. The decision by the pilot to continue the flight did not win him any award for exceptionally good judgment.

The following comments on the incident and philosophy expressed are germane to all who fly, not just the helicopter community.

Night was rapidly approaching and the crew was on its fourth leg of the day. They knew that another aircraft was inbound to their destination to pick them up and take them home. During their brief external inspection the aircrew did not find any discrepancies and all cockpit gauge indications were normal after the precautionary landing, but the chip light remained on. The trap was set for what could have been a catastrophic accident.

The questions raised are: What prompted an experienced pilot and aircrewman to depart and continue this flight after making the initial sound decision to execute a precautionary landing in a farmer's field? What prompted this crew, after responding to a primary indication of a transmission chip light and the secondary indication of a loud thump or bang, to disregard all previous professional and safety training, to violate unit SOP, and to violate their own personal minimum standards and good common sense?

On their external examination of the helicopter after the precautionary landing, the crew was looking for a secondary indication of an impending transmission failure when they already had such an indication — the loud bang. Apparently they were hoping not to find it. They either did not check the five individual transmission system chip lights behind a rear access panel, or if checked, since this elusive secondary indication was not discovered, the aircrew convinced themselves that the cockpit chip light was erroneous and that the accompanying bang must have been imagined. Therefore, they concluded that there was no reason to discontinue the flight any longer; the flight could be continued to destination before it got any darker. Also in their thoughts was the knowledge that their homeward transportation would be waiting, thus negating an unscheduled and undesired RON.

By its very nature, a detachment operation is somewhat unique: repetitive strange field landings, aircrew maturity in making daily decisions normally reserved for upper command echelons, and the limited exposure of aircrews to continual command presence while operating away from home base. These are but a few of the daily traps waiting to be set for this type of unique operation. Unique? No more unique than any other aviation command with its associated mission-related pitfalls that may have different community titles but surface as the same end results. . . complacency, nonexistent operational stress, get-home-itis, flathatting. You name it!

What with SOPs, safety doctrine, etc., already existing in the command covering all facets and aspects of independent and detachment operations, it would have been easy and convenient to attribute this mishap, which could just as well have been a multi-fatality accident, to the oft referred to syndrome "We buy you books and all you do is eat the covers."

Command responsibility has been and always will be a subject for discussion. Despite this crew's obvious lack of judgment, the commander succinctly described his own version of command responsibility in these words: "In reality the fact that an experienced crew could allow this particular trap to be set can only be attributed to a lack of proper operational, safety, and command leadership originating at the highest level. This command is presently conducting a major review of all aspects of its safety and operational disciplines to prevent this type of incident from recurring."

Put it down; leave it down

U.S. ARMY SAFETY CENTER

WHILE ON APPROACH to a runway about a mile and a half away, a CH-47 pilot saw the transmission chip detector light flicker. Rather than continue the approach, he immediately made a precautionary landing. As the helicopter touched down, the transmission exploded and the aircraft caught fire, causing major damage. But let's consider the brighter side of this picture. At the time of the emergency, six persons were on board the aircraft. If the pilot had ignored the warning light and continued his approach, all six persons could have been killed.

Any aviator who flies long enough sooner or later is going to have the opportunity to demonstrate, when the chips are down, whether or not his training and flying hours have been well spent. As you know, a helicopter is a mass of push-pull rods, chains, gearboxes, linkages, servos, and other items which generally work smoothly, but occasionally hang up and once in a while go "snap, crackle, and pop." When this happens, an aviator must have the good sense to put the aircraft down at once...and leave it down.

But this is not always the case. Accidents occur when pilots don't make precautionary landings when they should. Why don't they? Let's look at a few of the reasons some have given.

"It's probably just fuzz on the plug. We can make it."

"The Old Man doesn't like to fill out all the paperwork that's required if we put the aircraft down out here."

"Oh, don't get upset. I can handle it!"

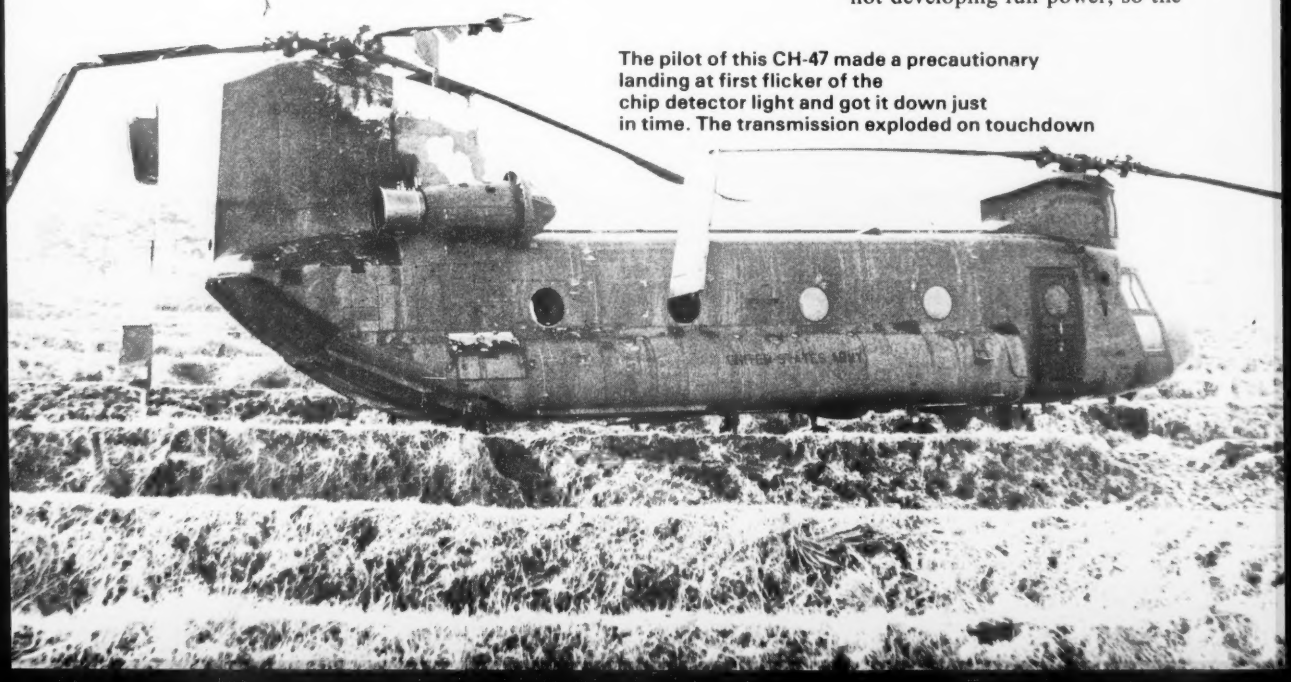
"That light comes on all the time; ignore it."

"I just brushed that tree. There's no real damage."

Excuses such as these can have catastrophic results. . .

A UH-1 pilot entered autorotation when the engine rpm dropped to 5200. The rpm then increased and the pilot made a power approach to the ground. Once on the ground, he decided that since the engine was still running, he could make it one more mile to an airfield. Complete engine failure occurred en route and the aircraft crashed.

In another case, an OH-6 was not developing full power, so the



The pilot of this CH-47 made a precautionary landing at first flicker of the chip detector light and got it down just in time. The transmission exploded on touchdown

pilot landed to see what was wrong. He then made a hover check and decided the engine was performing normally. Instead of having maintenance inspect the helicopter, he tried to continue his flight. The engine failed at 100 feet during takeoff, the helicopter crashed, and all on board were killed.

Another OH-6 pilot radioed that he was having trouble controlling excessive engine rpm. The problem continued for 10 minutes when the pilot said, "I think I just lost everything." Witnesses said the engine and rotor revved up and then was followed by relative silence. The main rotor severed the tail boom and the aircraft fell from about 1,500 feet. The aircraft was destroyed and the pilot killed because he failed to land after numerous indications of a malfunction.

Pilot continued flight after repeated indications of trouble

Ten minutes after takeoff, another helicopter pilot reported his engine detector light was on and that he was returning to home base. The last radio transmission heard was that the turbine outlet temperature was "out of sight," that the aircraft was vibrating severely, and that the pilot intended to land at the closest helipad. A witness stated that he saw flames coming from the rear of the helicopter and then the engine quit. The aircraft hit a 60-foot tree and sank in about 8 feet of water. All three occupants were killed.

It's hard to say why these aviators continued to fly rather than land, but no reason given could justify their decisions to continue flight and jeopardize lives and aircraft.

Huey pilot put it down after engine rpm dropped, then decided he could make it one more mile

Maintenance officers aren't immune to accidents and are no more qualified than any other aviator to fly a substandard aircraft even when there may be only a "suspected" malfunction.

In one case, an aviator decided that his aircraft was unflyable due to an increase in egt when power was applied. Black smoke was seen pouring from the tailpipe, oil vents, and particle separator. The unit maintenance officer made a 15-minute runup with the same signs of a malfunction, but then decided to fly the aircraft to the maintenance area. As he made a downwind, near-maximum performance takeoff, the engine failed. The aircraft rolled and slid 280 feet down a railroad track.

A decision to tow or slingload the helicopter to the maintenance area would have prevented this accident.

Regardless of any excuse, whether it be pride, mission accomplishment, or coercion by supervisory or maintenance personnel, it's safer to put that aircraft down--and leave it down--at the first sign of trouble.

what's new
In aviation training literature

TC 1-60
Forward Area Refueling and Rearming Points Operations

TC-160 is a circular derived from a Logistics Center study (June 1975) and an Ammunition Initiative Task Force Study (November 1977), conducted by Department of the Army. This publication is a joint effort between representatives from TRADOC, Centers, Schools and other agencies. This product presents guidelines and procedures for air cavalry and attack helicopter units while operating on the modern battlefield to establish, operate, organize and resupply forward area refueling and rearming points. Units began receiving this TC in June.

FM 1-105
The Aviator's Handbook

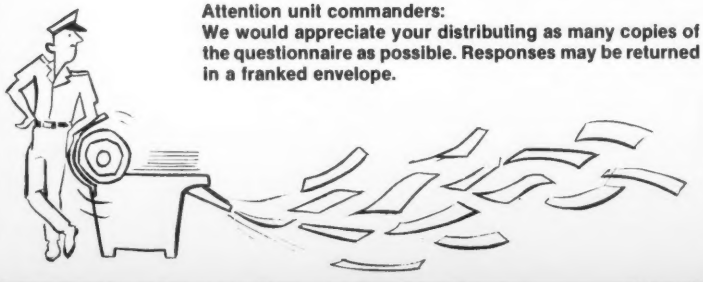
FM1-105, "Aviator's Handbook," is scheduled for revision in the near future. This FM was developed as a ready reference (pocket guide) to assist the aviator in the accomplishment of a mission under any environment or threat. It is designed to be a supplement to the many aviation field and technical manuals.

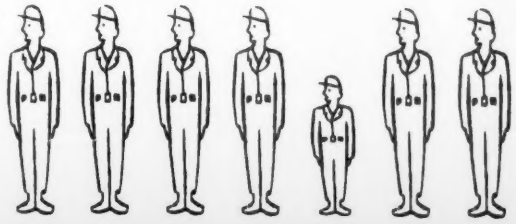
To ensure a complete and accurate handbook, suited to the needs of the aviator, the U. S. Army Aviation Center, Ft. Rucker, AL, solicits comments/recommendations, to assist us in revising the handbook.

Let us know how we can improve your handbook by writing directly or by filling out the following questionnaire and mailing to:

Commander
U. S. Army Aviation Center
ATTN: ATZQ-TD-TL
Ft. Rucker, AL 36362

Attention unit commanders:
We would appreciate your distributing as many copies of the questionnaire as possible. Responses may be returned in a franked envelope.





FM 1-105 — Aviator Handbook Questionnaire

Name _____ Unit _____

MOS _____ Rank _____ Duty Position _____

1. Have you ever seen FM 1-105? Yes _____ No _____
2. Are aviators in your unit familiar with and using FM 1-105?
3. Does your unit publications officer have this FM to give newly assigned aviators? _____
4. After reading FM 1-105, what changes would you like to see in this manual?

_____

5. Do you think a section on *first aid* would be beneficial? _____
6. Would a pocket size, loose-leaf binder with a more firm cover be more convenient than the present manual? _____

Reason: _____

_____

7. Should this FM be discontinued? _____
8. What is the most useful section in the handbook? _____

_____

9. What is contained in the handbook which is of no use to you as an aviator? _____

_____

10. What is your general feeling about this publication? _____

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Other comments/ideas _____

_____

_____

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Enlisted Personnel Management System

Personnel Changes At Branch

SFC Douglas E. Allen
Aviation Career Advisor
U.S. Army Military Personnel Center
Alexandria, VA

AS IN ANY OTHER unit or organization we at branch have personnel changes too. We have some new faces in our office and more to come.

It all started earlier this year when our former branch chief departed Military Personnel Center (MILPERCEN) to assume command of the 70th AVIM Battalion in Germany. He was replaced by LTC Richard Naughton, a Transportation Corps senior Army aviator with a maintenance background. He is a graduate of the aircraft maintenance officer course and the U. S. Army Command and General Staff College. He has been a rated Army aviator since 1964 and is dual rated.

The new branch sergeant major is SGM Blanca E. Varela, a personnel senior sergeant who recently was graduated from the Sergeants Major Academy. She also is an advanced NCO Education System (ANCOES) graduate.

Replacing me as chief of the aviation professional development team is SFC (P) George L. Alston who has been on board since January 1978. SFC (P) Alston is an aircraft maintenance senior sergeant with a background in both fixed wing and rotary wing aircraft and is a senior aircraft crewman. He is a graduate of 3d Army NCO Academy, aviation accident prevention management course, faculty development course, and fixed wing technical inspector course. His entire Army career has been in aviation. He was selected for promotion to master sergeant from the secondary zone of consideration by the Department of the Army Promotion Selection Board in January 1979.

An "old timer" on the team is SFC Walter "Ed" Trotman., SFC Trotman is a personnel senior sergeant who has become very knowledgable of the aviation maintenance career management field. He is a graduate of the 1st Army NCO Academy and the personnel staff NCO course.

Another "old timer" on the aviation professional development team is Ms. Lucia Deoca. Ms. Deoca is a military personnel management specialist with a background as an assignment manager and military personnel staffing technician. Ms. Deoca has 10 years service as a DA civilian, all in enlisted personnel management at Headquarters, Department of the Army level.

Newly selected to join the aviation team is SFC William D. Harkins, an aircraft maintenance senior sergeant with experience in many series of aircraft. He is a graduate of basic leadership course, at Camp Bullis, TX, 5th Army NCO Academy, and aircraft maintenance ANCOES.

SFC Harkins is a senior aircraft crewman with experience as mechanics helper, senior helicopter repairer, crewchief, flight engineer, technical inspector, shop foreman, and most recently as evaluation NCO at the U. S. Army Transportation School.

SFC Thomas L. Bice is departing the team with more than 3 years outstanding service managing the air operations and subfield of the transportation career management field. He is a personnel senior sergeant with a great variety of assignments in the past.

Among his accomplishments have been the smooth transition of military occupational specialty 93E (meteorological observer) from the Artillery branch into Transportation branch; he developed a method of assigning air traffic controllers to provide professional development; was deeply involved in selection of flight simulator operators and personnel to operate the Army's radar approach control (ARAC) facilities; and worked closely with the cadre of the Army's air traffic control school at the Aviation Center at Ft. Rucker, AL to overcome the worldwide shortage of ATC personnel. SFC Bice is scheduled to join U. S. Army Japan this month and a replacement for him has not been identified.

As I depart MILPERCEN I wish to express my appreciation to the true professionals in aviation maintenance for your support during the past 3½ years. My assignment as chief of the aviation maintenance professional development team has been very rewarding. I feel we have accomplished many worthwhile things. There is still room for improvement in the aviation maintenance career management field but change takes time. If you have any ideas on how to make it better I encourage you to submit suggestions through the incentive awards program or through your safety officer or unit commander to get the ball rolling. Remember, this is our Army and our future and we together are responsible for making it the best we can.

Editor's note: In behalf of its readers and itself, the *U. S. Army Aviation Digest* thanks SFC Allen for the outstanding job he has done preparing the EPMS Corner.

Tactical Instruments

Close Encounters of the Meteorological Kind

Major Bruce S. Beals
Lowe Division
Department of Flight Training
Fort Rucker, AL

IN THE PAST, use of all tactical aviation assets has been seriously hindered by poor weather and conditions which have reduced visibility in the area of operations.

In future conflicts we may not enjoy the luxury of saying, "We can't go; the weather is too bad." The situation might arise where we will have no choice in the matter.

Tactical instrument flight will better enable Army aviation to realize its full combat potential. With the publication of Change 2 to FM 1-5, "Instrument Flying and Navigation for Army Aviators," a new importance is being placed on tactical instrument flight. The emphasis on all-weather flying is a direct result of the potential threat and the dangers posed to Army aircraft operating forward of the corps rear boundary. Tactical instrument flight not only will degrade the enemy's ability to acquire targets, visually and optically, but also will restrict electronic acquisition. This is an important factor in the context of a medium or high intensity environment.

The first question might be: Why conduct a tactical instrument flight when we can operate below the weather in a terrain flight mode? The answer is two-fold. First, we may not be able to maintain terrain flight altitudes clear of the weather due to enemy dispositions, irregular terrain, natural or other restrictions to visibility or the nature of the mission (long distances at high gross weights).

Second, it may be to our advantage to use poor weather to mask our movements within the covering force and main battle areas, or possibly across the forward edge of the battle area (FEBA).

Whether or not tactical instrument flight is used will depend on the area in which the aircraft will be operating. To the rear of the corps boundary, standard instrument flight may be used with

AN/ARN-59 Radio Compass

ground controlled approaches (GCA) and possible use of VHF omnidirectional radio range (VOR) signals. Flight forward of the corps boundary may be limited to non-directional beacons.

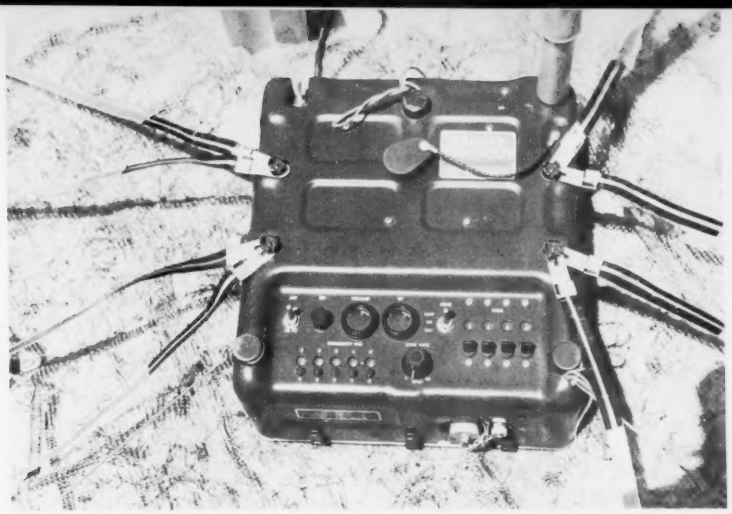
The primary means of tactical instrument flight will be through the use of the AN/ARN-59 or AN/ARN-83 radio compass systems in conjunction with the radio magnetic indicator (RMI). These direction finding sets are designed to provide, automatically,

AN/ARN-83 Radio Compass

a visual indication of the direction from which an incoming radio frequency (RF) signal is received.

The portable radio beacon set, AN/TRN-30 (EX-1), is the navigational aid (NAVAID) currently

Radio Magnetic Indicator (RMI)



Above and at right: AN/TRN-30 (Pathfinder Configuration)

being issued to field units. This beacon transmits a homing signal which is used in conjunction with the AN/ARN-59 or the AN/ARN-83. It provides a signal in the frequency range of 200 kHz to 535.5 kHz and 1605 kHz to 1750.5 kHz.

The beacon can be used in three basic configurations: the *tactical*, *semifixed* and *Pathfinder*. The range of the beacon depends on the wattage and mode of operation. In the Pathfinder configuration, with a 15-foot antenna and the aircraft operating below 500 feet above the highest obstacle (AHO), the range of the beacon normally is 15 kilometers. The range can be extended up to 185 kilometers through the use of a more powerful source of power and installation of a longer antenna. Range also is a function of the altitude of the aircraft.

The TRN-30 currently is on the Table of Organization and Equipment (TOE) of the Combat aviation battalions of the:

- Infantry, Airborne and Armored divisions
- Division aviation companies of the Infantry and Armored divisions
- Aviation groups of the Airmobile division
- Air traffic control (ATC) company (forward) of the air traffic control battalion (corps).

Most Pathfinders and ATC people are familiar with the TRN-30. Because of its small size and relatively light weight, it is ideal for unit tactical navigation training. It does not require a fixed site and can be moved and put into operation within minutes. Frequencies and identifiers can be changed at will and easily could be included in a unit standing operations procedure or Communications-Electronics Operation Instructions (CEOI).

A consideration in the use of TRN-30 is that because of the threat to Army aircraft near the FEBA, navigational aids will be limited to short periods of operation at low power settings. Threat forces have the ability to acquire and jam NAVAIDS or transmit bogus signals that could disrupt the mission. Consequently, NAVAIDS near the FEBA will be limited to short periods of operation at low power outputs. These factors must be planned for prior to the employment of any beacon and should be an integral part of the preflight scheme.

Preflight Planning. The planning portion of the tactical instrument flight encompasses many aspects, but must be focused on two general tracks. First, accomplishment of the mission with minimum exposure to threat weapons and, second, avoidance of terrain and obstacles.

The specific areas of preflight planning are covered in C2, FM 1-5. Generally, they are: mission requirements, enemy situation, air defense weapons, weather, communications, navigational aids and special equipment.

In preparing the tactical instrument flight map, essential input includes: the determination of the course line, minimum en route altitudes, takeoff, approach, holding, missed approach and emergency procedures. Details of the tactical instrument map and an explanation of the construction of the takeoff, en route, and approach safety zones, determination of the minimum en route altitudes (MEA) and approach procedures are found in C2, FM 1-5.

Training. Unit training programs in tactical instrument flight should be organized and conducted by instrument qualified personnel and should stress preflight planning, teamwork, precision instrument flying and confidence in the individual's ability and equipment. Innovation and imagination are the keys to an interesting and realistic tactical instrument training plan. Guidelines for the preparation of a unit training program can be found in AR 95-1, FM 1-60, FM 1-5, C2, FM 1-5 and FM 21-6.

Tactical Instrument Synthetic Flight Training System

Each unit can tailor its training needs to fit its mission, area of operation, level of aviator proficiency and resource availability.

The synthetic flight training system (SFTS) is an excellent training vehicle for tactical instruments. Although local SFTS sites do not have the ability to program their devices for tactical instrument flights, the World Wide Software Support Branch (WWSSB), Flight Simulator Division, Department of Academic Training, United States Army Aviation Center, Ft. Rucker, AL, has expert personnel available to assist in the programing of local devices and will provide advice on the technical aspects of SFTS tactical instrument flight. Most SFTSs are capable of simulating engagement by enemy weapons systems, manmade or terrain obstacles and almost any aircraft emergency situation possible. A tactical instrument program also can be designed to correspond with a local flying area, using the standard 1:50,000 tactical map.

During the preparation of the training program, coordination should be made with representatives from air defense, military intelligence, field artillery and any other element that could provide intelligence or fire support input to the overall plan. After the basics of tactical instrument flight have been mastered, more complicated and realistic situations can be planned. An example might be the inclusion of aviation assets into a higher level command post exercise (CPX) or tactical exercise without troops (TEWT), where the unit will be required to plan and conduct a simulated mission under tactical instrument conditions. Ideally, the mission could be flown in the SFTS in order to validate all the previous planning and the coordination between ground and aviation assets. The complexity and possibilities for realism in the training scenario are unlimited.

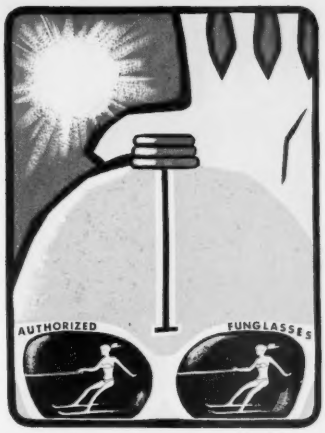
As the training program progresses and actual tactical instrument flights are planned, they initially should be conducted under visual flight rules (VFR). As the aviator's proficiency and confidence improve and the training program evolves, night tactical instrument flights will aid in realism and provide an instrument-like environment in which to operate. Tactical instrument flight under actual instrument (AI) conditions should only be conducted after the conditions outlined in C2, FM 1-5 are met.

Unit operations can coordinate with ATC personnel and develop preplanned routes for training. Operations also can insert tactical instrument training into field training exercises (FTX) in preparation for aircrew training manual (ATM) tests and the unit Army Training and Evaluation Program (ARTEP). For units with an actual contingency mission, tactical instrument flight routes can be developed to complement operational plans.

An ongoing and continuous program, backed with command emphasis, is essential to ensure that aviators are capable of conducting instrument flight under combat conditions. The ultimate goal is an aviator who is prepared to operate in meteorological conditions where terrain flight cannot be performed and standard instrument flight would expose the aviator to detection, acquisition and possible destruction by enemy weapons. The integration of tactical instrument flight training into the overall unit training program provides further flexibility and additional options to the aviation commander in the successful completion of any assigned mission.

CPT Bobby Ward and CPT Ron Kaetzel plan a TAC Instrument flight

VIEWS FROM READERS



Editor:

Reference your article "A Tactical Command Post" by MAJ Rudy, March 1979. If I may wave the flag a little, the "Jump TOC" concept described by MAJ Rudy was (and is) employed by the 7/17th Attack Helicopter Squadron, 6th Cavalry Brigade (AC) as early as 1975, as he mentions in his last paragraph. There is a technical difference in configuration, however, in that an APU lead is attached to the 1.5 kW generator which allows it to be simply plugged in to the external power receptacle. In addition, the caution panel and rpm warning circuit breakers are pulled to keep those components cool during prolonged operation and reduce unnecessary lights during night operation.

My compliments to MAJ Rudy for publicizing an original idea that has been guarded as our own for too long. It really works.

CW3 Joseph A. Hines
Flt Ops Off
B Trp, 7/17 Cav Sqdn
6th Cav Bde (AC)
Ft. Hood, TX 76544

Editor:

Your March issue of ***United States Army Aviation Digest*** has been very popular here due to the article "Air Force Liaison." Would you please send me three additional copies of this issue.

Eugene A. Bardal
ALO 1 Bde 2AD
Ft. Hood, TX 76544

• Your copies are in the mail.

Editor:

I would like to take this opportunity to thank your staff for printing the ATC related articles in the May 1979 ***Aviation Digest***. All personnel in the battalion are very pleased to be a part of ATC and have such enlightening articles published in ***Aviation Digest***.

Many requests were immediately made to my staff from the Soldiers in the battalion for additional copies of the May issue. Request 25 additional copies be forwarded to this headquarters for distribution to our remote sites.

LTC Jerry V. Holcombe
125th Air Traffic Control BN (Corps)
APO San Francisco 96301

• Copies you requested are in the mail.

Editor:

The New Mexico Army National Guard has consolidated a few ideas for Takeoff and Landing Data (TOLD) cards, and I've enclosed our final copy. Perhaps other units can use the format for their preflight planning.

1LT David S. Read
Executive Officer
717th Med Det (Hel Amb)
P. O. Box 4277
Santa Fe, NM 87501

Editor:

After reading COL John C. Bahnsen's article, "Helicopter Fundamental Tactics," April 1979, and numerous other related articles on the employment of attack helicopters, I have formulated the opinion that the ground force commander is going to be without attack helicopter support when threat forces close within the effective range of threat air defense weapons. It's a known fact that battlefield obscurations will limit the range at which targets can be acquired. Even with the new acquisition devices, many of the engagement ranges will be within the effective range of threat weapons. Although most of our publications do not address this issue, I feel the attack helicopter aircrews will stay and fight, especially when their support can mean the difference between victory and defeat. Rather than to avoid this phase of the battle, action should be initiated to identify tactics that would enhance survivability when engaging targets at close ranges. COL Bahnsen's views to the readers concerning this subject may prove helpful to aircrews who find themselves involved in a combat situation where the ground force commander is about to be overrun and the only available firing positions are within the effective range of threat air defense weapons.

Rush R. Wicker
DAC
Concepts Br, DCD
Ft. Rucker, AL 36362

Continued on page 48

TAKEOFF AND LANDING DATA CARD
(OH-58 and UH-1)

	Takeoff Site	Landing Site #1	Landing Site #2
Pressure Altitude			
Temperature			
Engine Cal Factor			
	Cal Ind	Cal Ind	Cal Ind
Max Torque Available			
Max GW for OGE Hover			
Torque Required at 5' Hover for Max GW computed above (Go-No-Go)			
Operating Wt (Basic/Oil/Crew)			
Fuel			
Payload (Cargo/Pax)			
Mission Gross Weight			
Torque Required For Mission GW at 5'			
Torque Required For Mission GW at 50'			

Remarks

NMARNG AASF-Ops Form 3

Shipping Helicopters

Story and photos by

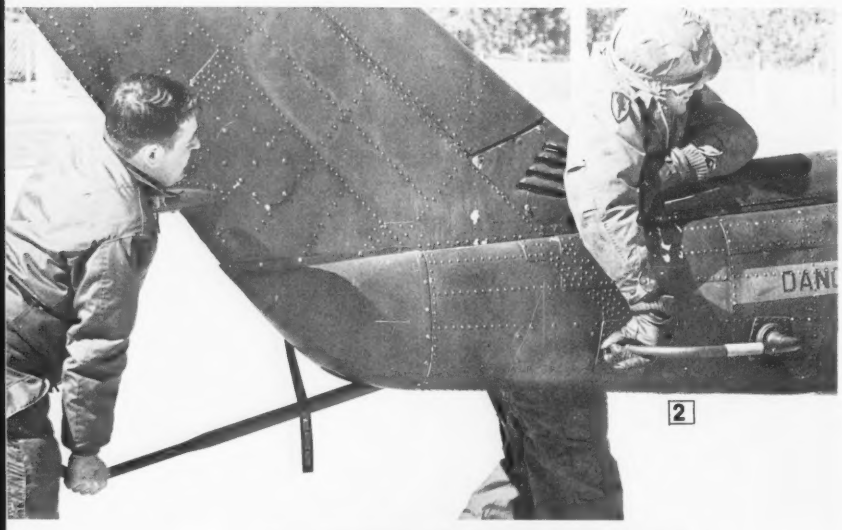
SP4 Bill Branley
Public Affairs Office
Fort Bragg, NC

SUPPOSE A commander were going to conduct a training exercise and wanted to include helicopters? If they were close, the commander could just have flown them over. But if they were several hundred miles away, the helicopters might have to be taken apart and loaded onto other aircraft — which is exactly what aviators from the 101st Airborne Division (Air Assault), at Ft. Campbell, KY, did for a recent exercise at Ft. Bragg, NC.

In order to participate in Dragon Team VI, an XVIII Airborne Corps Emergency Deployment Readiness Exercise (EDRE) which pitted the 82d Airborne Division against the 101st in a mythical war game, the Ft. Campbell Soldiers brought a wide variety of aircraft with them. UH-1 Hueys, OH-58 Kiowas and AH-1 Cobras were in abundance when the helicopters started rolling off the ramps of Air Force C-141 Starlifters.

"We can put the Cobras together in no time at all," said Sergeant Don Verble, Troop A, 2nd Squadron, 17th Cavalry. "We have two of them here for the exercise."

While Cobra crews worked diligently on their aircraft, members of the 158th Aviation Battalion of the 101st were busy



1 Aviation mechanics from the 101st Airborne Division (Air Assault) prepare to lift a pair of main rotor blades in order to mount them on an aircraft. Helicopter assembly procedures were conducted in conjunction with the XVIII Airborne Corps Dragon Team VI EDRE. 2 Ft. Campbell crewmen guide a helicopter to an assembly area after offloading it from an Air Force C-141 aircraft at Pope Air Force Base, NC. 3 Although the blade might seem as "light as air" in flight, these 101st Airborne Soldiers are discovering that a 200-pound rotor blade from a helicopter can be difficult to manage. Soldiers loaded the piece and continued offloading aircraft at Pope AFB

4 Finishing Touches — Safety checks before flight make flying safer for 101st pilots. Division mechanics ensure that safety checks are performed. 5 Mission Essential — SGT Don Verble (left) and SP4 Lester Washington, both from Troop A, 2d Squadron, 17th Cavalry, install essential items on one of two AH-1 Cobras used in Dragon Team VI. The helicopters were assembled and flown to Ft. Bragg for the exercise. 6 101st aviation mechanics combine their strengths to hoist main rotor assembly onto a protective mattress until it is used. Mechanics spent most of the first day of Dragon Team VI assembling helicopters as they arrived by jet from Ft. Campbell

unloading their Huey helicopters slated for the exercise. It was the concerted effort of both units, however, that enabled the aviation aspect of the EDRE to operate smoothly. As crews towed their helicopters to the assembly area, other Soldiers already were busy installing the 200-pound wings, gun mounts and other equipment essential to the mission.

"We had 14 aircraft and 99 crewmembers participating in the exercise," said CW3 Mark Moller, S-3 section, 158th Aviation Battalion.

The 17th Cavalry's effort included 2 Cobras, 2 Hueys, 2 Kiowas and about 30 crewmembers. A full crew, including ground personnel, can put together a helicopter in an hour or less, depending on the type.

"Naturally, our speed also depends on how much has to be assembled," said SP4 Lester Washington, Troop A, 2/17th Cavalry. "Sometimes we only have to install the rotor blades and maybe one or two other items. In the case of the Cobra, the weapons also have to be mounted."

SP4 Washington added that the crews get "lots of practice" at assembling their assigned aircraft.

The aviators returned to Ft. Campbell following the completion of Dragon Team VI.

National Guard Aids Injured Hunter

SP5 Dail M. T. Adams
Office of Public Affairs
Oregon National Guard
Salem, OR

THE MORNING IN early November broke routinely for four Oregon Army Guardsmen. Waiting with their UH-1 Huey helicopter, they were on emergency medevac standby at Dale Ranger Station, 67 miles south of Pendleton, OR. During the 4 preceeding days of their shift they had spotted a few small forest fires from the air and searched for two lost teenagers who eventually walked out.

About 1130 hours, the Grant County Sheriff called. An injured hunter with a cut artery was stranded on the back side of Baldy Mountain. The Guardsmen quickly gathered up equipment, coordinated the search at the forestry office, and started their helicopter. They flew south to John Day, picked up a deputy sheriff to help search for the hunter's camp and headed southeast toward Baldy Mountain, 20 miles outside of Prairie City.

Sunday had seemed a lucky day for Gene Collier of Turner, OR, when he shot an elk. This Tuesday morning he, his brother James Collier and brother-in-law Wendel Stanley were returning to pack out a load of meat. The elk already was skinned, quartered and hanging from a tree. Later they planned to track an elk that James had wounded the day before. Suddenly, within a hundred yards of Sunday's elk, another appeared. Stanley got off a good shot and the four-point buck fell.

Stanley and James began skinning the elk's hindquarters as Gene attacked the neck area. The knife slipped. Gene quietly pulled the knife out of his left thigh.

His brother looked up and said, "What did you do? Gouge yourself with the horn?"

Stanley watched Gene limp away to a spot where he could sit down. "The pain must have paralyzed his leg," Stanley recalled, "because he couldn't move it. He was hopping on his good foot. I saw the blood squirting out of his leg. He was on the ground by the time I rushed over and threw my hand over the wound."

"The bleeding was difficult to stop," Stanley continued. "At one point while I was applying direct pressure the wound broke loose and started bleeding again. Apparently I was getting tired and relaxed the pressure on it a little."

Gene never lost consciousness. "I was a little bit in shock at times but not enough that I didn't know what was going on," he said.

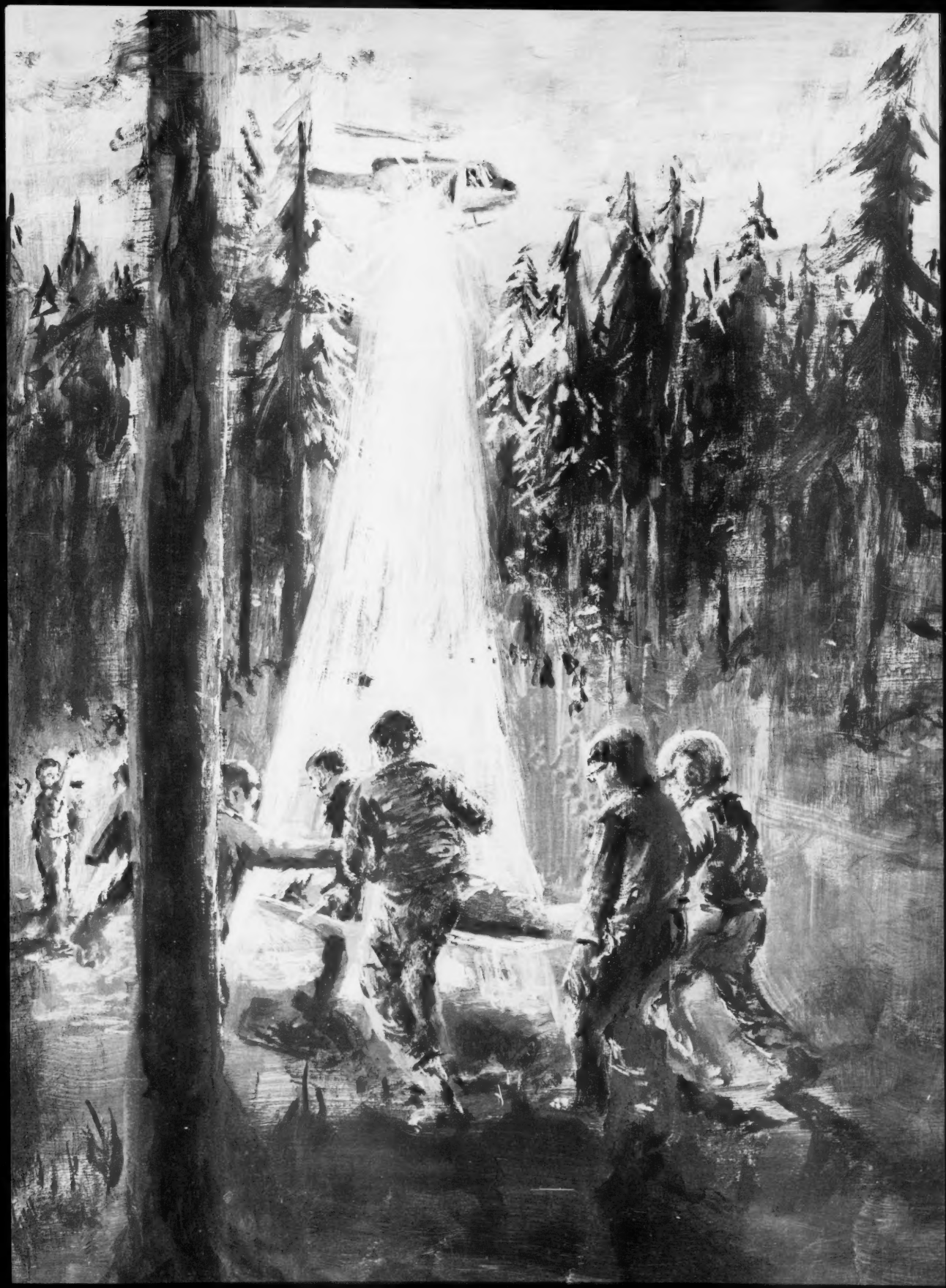
"Gene told us it had started bleeding again," Stanley said. "He had two layers of clothes on and could tell better than we whether the bleeding had stopped.

"After that we decided to cut away his left pants leg," Stanley said, "so we could see for ourselves if it was bleeding." James cut around the wound, while Stanley carefully kept the pressure on, leaving part of the pants right over the wound.

When the bleeding seemed stopped, James handed Stanley a pair of cotton gloves which he folded and placed over the wound. Then James removed and tore his T-shirt into strips to secure the glove compress. After bandaging Gene, covering him with coats and making him as comfortable as possible, brother James went for help. The hike back to the road took about 1½ hours. At the small Prairie City Police Office he called the Grant County Sheriff's Department in John Day.

"They had a police radio blackout going. I couldn't get a hold of anybody," James said. The dispatcher wouldn't break the radio silence because an escaped Idaho convict was loose in the area.

After 20 to 30 minutes, James decided to go across the street to get some elk hunters. "I knew we would need help getting my brothers out," he said. "I'd seen three rigs of hunters heading into a tavern. Then the state, county and city police, all three of them, showed up, but one of the county boys waved at me so I



An Army UH-1 Huey helicopter searches for injured hunter

went over there."

Unknown to James, Sheriff Tom Negus had immediately requested the National Guard standby crew at Dale to respond to the call for help.

Meanwhile, in the forest, Stanley had built a fire to keep his brother-in-law warm. As he finished skinning the elk, Stanley continued to talk to Gene. Then he laid out the hide for Gene to lie on.

Sometime after noon, Stanley said he heard the squeak of an amplifier. He could hear somebody talking over it, but couldn't make out what they were saying. "At that time I thought they wanted directions or a location," he said. "So I fired a shot. They came on again. I fired another shot. They came on a third time, so I fired another shot. About 15 or 20 minutes later it sounded like they were still in the same area so I didn't fire.

"I guess I answered correctly," Stanley continued, "because I found out later they asked something like, 'If you can hear me and understand what I'm saying, fire a shot.' Well, I fired but I couldn't understand. Then they asked, 'Is the patient stable?' and, 'Have you stopped the bleeding?' Their last statement was, 'A helicopter is on its way so don't fire anymore.'

"The helicopter soon arrived over the canyon," Stanley said, "When I realized that was our ticket out I started piling evergreen boughs on the fire to create smoke. They located us right away and passed over us several times before finally dropping a note."

Flying overhead, the helicopter crew spotted the smoke signal instantly, but couldn't find a suitable landing spot. SSgt Richard Hosmer, the crewchief, said, "We thought we could get out on a rock outcropping but we couldn't hover because the aircraft was too heavy. We dropped a note bag filled with gravel to the hunters and told them, 'We're trying to land on top. It's awful windy. We have to burn off more fuel and get rid of some excess weight.' "

The medevac crew then flew to the Morgan Ranch, dropped off Deputy Sheriff David Haynes, and off loaded 600 pounds of excess equipment.

The helicopter pilot, CW3 Tom Borloglou, said, "We searched several miles in all directions for a suitable landing spot. There were steep slopes all around and any spot that even looked a little level was covered with trees."

When CW3 Borloglou and CW3 Mike Harper, copilot, considered the possibility of using the steep rocky formation at the top of the hunter's hill they knew they wouldn't be able to land on it. "That was a last minute, last possible chance," CW3 Borloglou said. "The first time we looked at it we didn't even consider it." The warrant officer pilot felt the choice was up to the two who would be stepping out onto the 24-inch pinnacle.

Sergeant Hosmer and crewmember Sergeant Darryl Krupicka, an emergency medical technician II (EMT) said, "You get us over there and we'll get out."

The wind was "Squirrely — not very strong but gusty and swirling," said CW3 Harper. It was not blowing in a direction favorable to the kind of approach the pilots wanted to make at the 6,500 feet altitude.

CW3 Borloglou said, "We came in from a different direction, turned the machine around at a hover, then slid into place, still hovering. There were trees and snags all around the aircraft."

Inching closer and closer, CW3 Borloglou looked out and maintained a horizon to keep the helicopter level and stable. He could see forward, left and down through the "chin bubble" (the helicopter foot-level window). His crew acted as his eyes in other directions. "Those guys were really telling me what I wanted to know," he said. "No garbage, just snappy answers."

Sergeant Hosmer sat on the left behind the pilot. He could see the tailrotor and judge its clearance from dead trees and snags.

Sergeant Krupicka could see to the right and rear for potential hazards. Copilot Harper could tell the pilot how far their right skid was from the rock. He moved the controls lightly to help CW3 Borloglou gauge the direction the

crew wanted him to go. The pilots continued to monitor the engine instruments to make sure their power was not excessive. The helicopter hovered about 2 feet above and 2 feet to one side of the rock.

Sergeant Krupicka, first to descend, described his exit from the helicopter: "I crawled out and down, and hung on to the skids. Sergeant Hosmer handed me the equipment — climbing ropes, my black medical bag, two hand-held radios, survival equipment and a 6-foot plywood backboard to carry the patient on. We wore our survival vests and helmets."

After Sergeant Hosmer crawled out the two squatted down on the little ridge while the helicopter took off. Sergeant Krupicka continued, "Using the helicopter hovering over the camp to guide us, we went down the cliff, and ran right into Gene Collier and Stanley."

As the National Guard rescuers' trekked down the hill to the camp site, Stanley tried to keep Gene's wound elevated. "His hip and knee started bothering him. He just felt he had to move somewhere," Stanley said. "But moving around didn't seem to help much."

When Sergeants Krupicka and Hosmer reached the hunters, they and Stanley laid Gene on the backboard. Sergeant Krupicka checked his blood pressure, pulse and other vital signs about 1330 hours. Stanley, having applied first aid hours before, felt happy the vital signs were "in pretty good shape at this point."

When Sergeant Krupicka took the makeshift glove compress off Gene's leg, the wound wasn't spurting anymore but was still bleeding a little. The men swabbed around the wound with bedadine disinfectant and wrapped him back up with a sterile bandage.

According to Sergeant Krupicka, Gene Collier bled internally the whole time. His thigh was swollen above the stab wound.

After putting out the signal fire and securing Gene to the backboard, Stanley, along with Sergeants Krupicka and Hosmer, started packing the patient downhill through the forest.

Vital signs of the patient and progress, location and conditions of the rescue party were communicated periodically through the two hand radios the sergeants carried. One radio, belonging to the Grant County Sheriff's Department, let them talk with a deputy and an ambulance crew standing by at the nearest road on the next hill. The other radio's frequency kept them in touch with the helicopter which could relay messages to the hospital by way of John Day airfield's telephone when the deputy and ambulance were out of radio range.

"With three of us packing him out, we only went about 500 yards in 2 hours because of the terrain," Sergeant Hosmer said. "We had to go down one big hill, then down a draw, then up another hill." The total route was about 4½ miles to the ambulance.

In the late afternoon near the half mile mark James Collier, along with Grant County Sheriff's Department Deputies David Haynes and David Fredenburgh, who had hiked in from the road, met the party to help pack the patient out.

"It took all five of us to pack him out," explained Sergeant Krupicka. "His brother had a bad knee and couldn't help. We struggled up and down on game trails where it was hard to get the backboard through the trees and brush."

At 1630 hours, nearly sunset, curious hunters learned about the downed man from the deputy and ambulance attendants waiting since 1500 hours at the road's end. They hurried back to their camp to gather lights and more people to help.

Six men met the rescue party at the base of the last hill. "A little better than a quarter mile to go — almost straight up," described Krupicka.

The main party had hiked about three-fourths of a mile in the dark. "We were sure glad to see the other campers," Stanley said. "They had a lantern which was a big help to us."

In between refueling trips back to John Day, the Army Guard helicopter monitored the rescue party's route. In the moon's first quarter light, the pilot had no trouble picking out terrain features. For the people on the ground the forest seemed pitch black. So the pilots played their search lights onto the hillside in an attempt to light a path for the ground crew.

"We went in the wrong direction once but the helicopter picked out our mistake before we got very far off course," Sergeant Hosmer said.

Ten men at a time side-stepped up the incline with the patient while another two carried lanterns and flashlights, helmets, ropes and medical gear. "I don't think we would have gotten Collier up the hill if the other guys hadn't shown up to help us," said Sergeant Krupicka.

Ten hours after his accident Gene Collier reached the ambulance. He was transported to a hospital where he spent 3 hours in surgery. Later he learned he had sliced through a nerve and most of his femoral artery. "If it hadn't been for my brother-in-law Stanley's quick action," Gene said, "I wouldn't be alive."

"The two National Guardsmen (Sergeants Krupicka and Hosmer) and Deputy Fredenburgh never got off that pack except to get circulation back into their fingers," James Collier said. "They worked their hearts out."

Commenting on the teamwork involved in the rescue, CW3 Harper, the copilot, summed up, "We were pretty certain the fellow was hurt and any effort expended was worth it. In a critical situation you try to extend yourself as much as possible. I certainly wouldn't do anything like that for fun."

Reporting Final

Late News From Army Aviation Activities

FROM FORT EUSTIS

Command Change. Major General designee Harold I. Small has been named to succeed Major General Oren E. DeHaven as commanding general of Ft. Eustis, VA and commandant of the Transportation School. General DeHaven assumed command of the U.S. Army Logistics Center at nearby Ft. Lee, VA on 31 July. General Small, who recently was nominated for his second star, has been director of logistics for the U.S. Readiness Command at MacDill Air Force Base, FL. He is expected to take command of Ft. Eustis on the 20th of this month.

(USATC-PAO)

Time In Service Requirement For SQT Testing. The 17K Soldier's Manual states that a Soldier must be in the Army 17 months to be eligible for SQT testing. This is WRONG and is in contravention with paragraph 5—7b(1), AR 600-200 which states that the criteria is 12 months active federal service as of the date of testing. Don't be misled; follow the reg!

(USATSC)

FROM FORT RUCKER

Broken Wing Awards. His ability to land a helicopter safely after a partial loss of engine power has earned a Broken Wing Award for Chief Warrant Officer James R. Little, an instructor pilot at the Aviation Center. The incident occurred during a night training flight in a UH-1 Huey when night vision goggles were being used. After takeoff and flying at about 200 feet and 60 knots, the aircraft engine malfunctioned and lost part of its power. CWO Little selected a landing area, completed the descent with reduced power and put the helicopter down. There were no injuries or damage to the aircraft.

Chief Warrant Officer David E. Casady of the Aviation Center also has received the Broken Wing Award. He was instructor pilot and his student was at the controls of the UH-1 when it sustained a tailrotor failure on a landing approach. The aircraft yawed severely to the right, and the danger was intensified by a crosswind plus low airspeed and altitude. Mr. Casady took the controls and retarded the throttle to compensate for the yaw and used collective pitch to cushion the helicopter onto the ground. There were no injuries and only minimum damage to the aircraft's skids.

Paul L. Lasseter is Northrup Worldwide Aircraft Services' first pilot to be presented the Army's Broken Wing Award. Assigned at the Aviation Center's Lowe Army Airfield, Mr. Lasseter was flying a UH-1 which experienced a sprag clutch failure during a night functional check flight. He started a turning descent from about 7,000 feet. Upon feeling the aircraft vibrating, he noticed the dual tachometer needles split and engine revolutions per minute at 7,200. He slowly reduced the throttle to rejoin the needles, then shut the engine down and autorotated safely to an unlit Army airfield.

Army Aviation Museum Update. Army Aviation Museum Foundation, Inc., is accelerating existing plans for the funding of a new $2 million museum building. It will house the $60 million collection of helicopters, airplanes and Army memorabilia now on display in three buildings. Edmund L. "Skip" Eveleth, a 45-year veteran of the aviation industry, is directing the fund-raising program.

Missouri's 38th Completes Training. Company D, 38th Aviation Battalion, Missouri National Guard, recently finished two weeks of training at Ft. Rucker and returned to its home station at Whiteman Air Force Base, MO. The 38th, with about 200 members, is an attack helicopter company, equipped with UH-1 Hueys and OH-58 Kiowas. There was qualification in the weapon systems for the Huey pilots and aero-

scout training for the Kiowa aviators. Ground crew personnel, including armament handlers, medical personnel, flight operators and mechanics, received refresher courses in their respective fields. The entire unit was integrated into the training system at the Aviation Center.

USMA Cadets Arrive. Forty-seven cadets from the U.S. Military Academy, West Point, NY, arrived at the Aviation Center in July. The West Pointers' training included 15 hours of instruction in the TH-55 helicopter plus various aviation related academic subjects.

Life Support Equipment Document. An untold number of lives may be saved because of work done at the Aviation Center by three men who were graduated recently from the Warrant Officer Senior Course. Chief Warrant Officers Francis G. Boisseau, Harold D. Hintze and Edgar A. Hillis wrote a 742-page document on some items of aviation life support equipment (ALSE), complete with 450 supporting 35 mm slides. Its purpose is to assist in the requisition, maintenance, inspection and repair of ALSE. Plans call for training packets to be produced from it and to send them to aviation units to help establish a viable ALSE program. This important work was recognized when BG (P) James H. Patterson, Ft. Rucker's former deputy commanding general, presented them certificates of achievement and letters of commendation.

(USAAVNC-PAO)

FROM ST. LOUIS

CH-47C Rotor Blade Test Results. Words like "feasible" and "operated satisfactorily" appear in the report following icing testing of the CH-47 Chinook helicopter fiberglass rotor blades earlier this year at St. Paul, MN.

One CH-47C with a prototype fiberglass blade deice system was tested under natural and artificial icing conditions for about 6 weeks by the U.S. Army Aviation Research and Development Command's Army Aviation Engineering Flight Activity from Edwards Air Force Base, CA.

The testing program was conducted in two phases, with the blade deice system operating automatically in a protected condition and with it in a standby status in an unprotected condition. These rotor blades underwent 18 flight hours of tests subjected to natural and artificial icing conditions.

This fiberglass rotor blade system was evaluated in conditions varying from light to moderate icing conditions and at temperatures ranging from minus 4 to minus 16 degrees centigrade. Time in the icing environment varied from 28 to 145 minutes.

Testing results indicate the protected rotor blade system operated satisfactorily providing good deice protection and this concept appears feasible. The unprotected rotor blades also operated satisfactorily under similar limited test conditions. The unprotected blade test results were encouraging. Low ice accretion and minimal asymmetric shed characteristics were observed. However, further testing is planned to fully define both protected and unprotected flight envelopes and will include an expanded range of temperatures and icing conditions.

(AVRADCOM PAO)

FROM MAINE

Guard Huey Crew Rescues Pair. Two young men stranded 5 hours sitting on a stump in the Saco River, were rescued recently by an Army National Guard helicopter crew.

Peter Gaudreau and Robert Ledoux were riding a raft composed of two inner tubes and a cover holding the tubes together when it struck a logjam and broke apart. The two men were able to climb onto a stump sticking out of the water. They weren't wearing life jackets and were dangerously close to rapids. The rain swollen river is about 500 feet wide where the pair was marooned.

A call for help went to Colonel Albert J. White, commanding officer of the 112th Medical Co. (Air Ambulance), Maine Army National Guard, which had just completed a duty drill at the Bangor International Airport.

Captain Michael G. Casey, executive officer, and three other men flew to the scene in a UH-1H Huey helicopter especially rigged for rescue work. The crew lowered a rescue net to the men and they were winched aboard the helicopter, one at a time, about 60 to 70 feet above the water.

Captain Casey, who is one of Maine's most decorated pilots, said the rescue operation went "rather slick." One of his hardest problems, he said, was to hold the helicopter stationary while looking at the rapidly-moving water beneath him during the rescue maneuver.

Other helicopter crewmen were Warrant Officer George Dersham of Brunswick, the copilot; Sergeant Harry Stickney, Old Town, crewchief; and Corporal Gregory Small, Brewer, medic. **(MAINE SUNDAY TELEGRAM)**

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, DARCOM, ATTN: DRCPO-ALSE, POB 209, St. Louis, MO 63166

Importance of Aviation Life Support Equipment (ALSE)

Each time you depart on a flight, you should prepare for the possibility of not returning. Many of us who fly in the Continental United States feel that being rescued in the event of an aircraft accident is *almost* a certainty.

The wreckage of one aircraft was found in June 1979. The pilot was on a routine flight in the comparatively densely populated state of New York when his aircraft crashed. The year of the aircraft crash was 1954.

Got Our Number

If you have a need to call the DARCOM Project Office for ALSE, we now have a new number. For AUTOVON call 693-3307 or 693-3308. For commercial users call area code 314-263-3307 or 263-3308.

Dual Numbers

The Army, Navy and Air Force sometimes use the same types of ALSE, so why not have one technical manual for triservice use? In some instances this has been done and has saved many dollars. Some of the dual numbered manuals which should be of interest to the users of ALSE are:

- TO 15X-5-4-4-12/TM 55-1660-243-12, Maintenance Instructions for the MBU-5/P Oxygen Mask.
- TO 14S-1-4-22/TM 55-1680-321-12, De Salting Kit MK-2.
- TO 14S-10-2-2/TM 55-1680-322-12, Light Distress Marker SDU-5/E.
- TO 15X-5-4-4-13/TM 55-1660-243-20P, Illustrated Instructions and Parts Breakdown for the MBU-5/P Oxygen Mask.
- TO 15X-1-1/TM 55-1660-245-13/NAVER 03-50-1, Oxygen Equipment.

The above publications should be available from The Adjutant General. Also TO 14S-1-102/TM 5-4220-204-14, USAF Flotation Equipment, is being updated. The Air Force has changes up through change 22. The Army version of this publication is only current through change 8. The missing changes can be ordered directly from the Air Force until our new updated publication is available.

Cyalume Lightsticks

I hear that some of our aircrewmembers are now carrying the Cyalume Lightsticks as a part of their ALSE system. The lightsticks have national stock numbers as follows:

- NSN 6260-00-106-7478, wand, chemical light, 4 inch, general purpose.
- NSN 6260-01-074-4230, wand, chemical light, 6 inch, 30-minute high intensity.
- NSN 6260-01-074-4229, wand, chemical light, 6 inch, 12-hour general purpose.

The lightstick is made up of two chemicals separated by a thin breakable glass. When you need light, you simply squeeze the lightstick to break the thin glass and the light will appear as the chemicals are mixed. The lightstick does not contain heat or sparks and is advertised as safe to use in areas which contain combustible mixtures of gases. Of course once you activiate the lightstick it cannot be turned off.

The lightstick is waterproof and can be used in the rain or underwater. It has a shelf life of 4 years. Should the lightstick container become ruptured, the chemical will stain clothing.

However, the chemical is nontoxic and no special measures are needed in case of contact with the skin or eyes. You merely rinse the skin contacted thoroughly with water.

Heatstroke

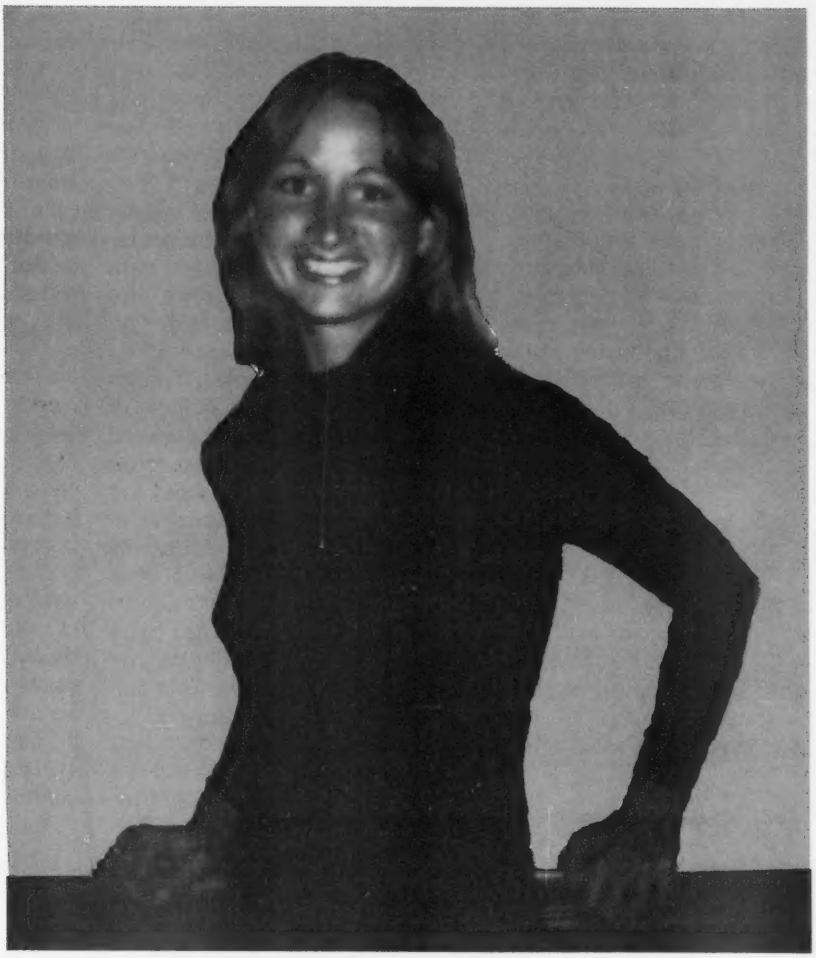
Heatstroke can occur at home as well as in a survival situation during the hot summer season. You should be aware of the symptoms of heatstroke especially if you are alone and attempting to survive an aircrash.

Heatstroke can be anticipated. Watch for headaches and dizziness combined with nausea and dry hot skin, fever and a fast pulse. If these warning signs appear, get to a cool place and rest.

In some survival situations it may be advisable if you are walking, to travel in the very early morning or late evening hours, to avoid the hot midday sun.

No matter where you are during the summer season, the best way to avoid heatstroke is by being cautious. If you are going to be active in hot weather, eat light, easily digestible foods — such as lean meats, fruits and vegetables — because they tax the body less. Leave alcohol alone and increase your salt intake. Wear loose clothing through which the air can circulate.

If heatstroke should occur, you should get immediate first aid. Attempt to cool yourself or the victim and keep the head raised. Remove clothing and cover with a sheet if available, occasionally sprinkling



Pamela
Blien

it with cool water. A wet cloth to the head also will help. The only recommended drink during this period is cool salted water — and if possible get the victim to a doctor.

Credit Voucher

If you requisiton the survival kit, NSN 8465-00-177-4819, you will receive it without the butane lighter and signal flares. Department of Transportation has determined that shipment of these items is a safety violation. We are attempting to get a waiver of the shipping restriction. Meanwhile, you will be issued a credit voucher for the price of the missing components by DPSC.

Valve Job

An aviation unit recently inspected 57 LRU-3 life rafts and found that 21 of the CO2 cylinders had incorrect inflation valves MIL-V-25492-Type 2. CO2 cylinders should have correct inflation valves, NSN 4220-00-152-1327 (MIL-V-81722) installed. Action is underway to have storage/supply depots correct this deficiency. Recommend inspection of the LRU-3 life rafts CO2 cylinder be conducted and proper valve installed. Point of contact at TSARCOM for this project is Mr. DuBray, AUTOVON 693-2472.

Triservice Flight Jacket

With the type classification of the CWU-27/P flight coverall as standard "A," the CWU-45/P USAF/Navy cold weather sage green flight jacket is being considered for use by Army aircrewmembers. More data will be furnished as it becomes available. Common Table of Allowances (CTA) 50-900 is the authority document for aircrewmembers' clothing and Supply Bulletin SB 700-20 is also a good source document for Army authorized equipment. Point of contact at TSARCOM for this project is Mr. Rainey Bell, AUTOVON 693-3307.

WHAT IS NIGHT FLIGHT OFF-CENTER VISION?

YOU HAVE 20/20 day vision and you consider yourself a good day visual flight rules (VFR) pilot. Your eyes work well for you during the day, so won't they do the same at night? No! They will work well at night only if you properly use them.

The best way to understand night vision is to imagine that you are using a completely different visual system — and you are! During the day you use central vision, looking straight at an object. As you look at the object, the reflected light strikes the center of the retina, the fovea, where the daytime visual receptors, the cones, are concentrated.

In a dark night environment your cone cells don't receive enough light to permit them to properly function. But your night visual receptors, the rods, can only start functioning when the light level is low. Initially the rod cells are 100 times as sensitive to light as the cones and this increases to 100,000 times as sensitive in the fully dark-adapted state. This may seem that human eyes are especially designed for adaptation to a night environment, but the cat, a night creature, has rod cells that are six times more sensitive than ours.

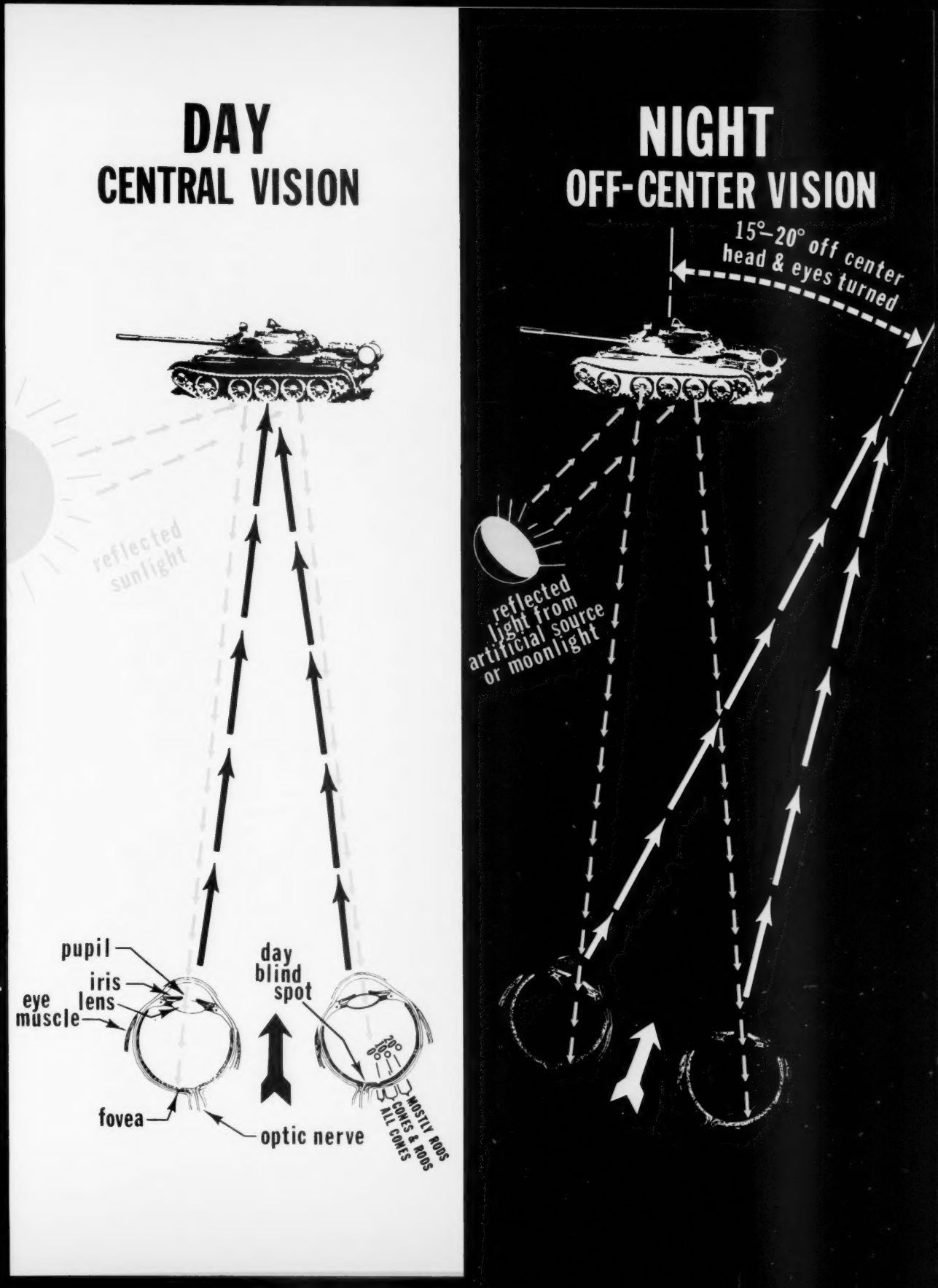
Whereas the cones are centrally located, the rods are mostly concentrated in a ring around the fovea about 10 to 20 degrees off center. To see at all at night, you must look off center or to the side of the viewed object at least 2 degrees to be outside the fovea. Beyond the 2 degrees the cone density decreases and the rod density starts increasing. To see at your best, you must look off center at about 15 to 20 degrees to be in the area of maximum rod density for both eyes. This fact is well worth remembering.

It has been determined that the size of the fovea is not the same for all people. An ophthalmologist found that the night central blind spot (area of total cones) varies in shape and size among different people.

To determine the shape and size of your own fovea, on a clear night go outside and look up at the sky. Select an area of dim stars. Stare at one star using central day vision and the star will disappear. Then stare at the next closest star, then the next, working away from the original star until it reappears. Try this working both sides, above, and below to determine your own night central blind spot. This short exercise should give you a better understanding of your correct off-center vision.

With good off-center vision, faint distant objects, dim lights of an inverted Y light pattern in a landing area, and other aircraft easily will be seen. Even though we are not true night creatures, if we understand our night vision we can fly with confidence and safety.

CW2 Robert L. Portman
Department of Flight Training
U. S. Army Aviation Center
Fort Rucker, AL


DAY
CENTRAL VISION
reflected sunlight
pupil
iris
eye lens
muscle
day blind spot
fovea
optic nerve
20°
10°
0°
MOSTLY RODS
CONES & RODS
ALL CONES
NIGHT
OFF-CENTER VISION
15°–20° off center
head & eyes turned
reflected light from artificial source or moonlight

This article describes a system to track and balance helicopter rotors. The system has been purchased through the Quick Return on Investment Program (QRIP) by several FORSCOM installations. Significant savings in dollars and fuel have been obtained by utilizing these systems. Other potential QRIP projects exist for aviation maintenance organizations and it is hoped that this article will generate more awareness of and interest in the program.

Major General R. G. Fazakerley
(Former) DCS, Comptroller
Headquarters, FORSCOM

Tracking and Balancing Helicopter Blades

Claud C. Ruthven
Industrial Engineer
Headquarters, Forces Command
Fort McPherson, GA

IN 1977 I TOOK a TDY trip to evaluate several projects that had been submitted to HQ FORSCOM for approval under the Quick Return on Investment Program. One of these projects involved a helicopter blade, track and balance system. During this trip, I heard a story that contained an implied apology. The following story was told in a serious vein by a helicopter mechanic who "had been fooling with these birds for more than 25 years. . ."

Aviation maintenance personnel know there is only one method to bring a main helicopter blade into track and balance. To track, you color each end of the main blade (usually red and black), run the engine, hold up a flag, check the marks on the flag, and if they don't overlay each other, you adjust the blade until they do.

To balance the blade, you add weight at designated locations to the blade's light side, and then check the balance. Keep repeating this process until the balance is passable.

If these two actions fail to do the job, remove the blade, take it into the maintenance shop and keep working on it until it is passable. Then put the blade back on the bird and conduct ground and air tests. If the blade is still out, keep repeating the process until you get passable results. If you bear in mind that sometimes you get one that you can never get right, then you will understand the general process.

I'm sure this story and method, with possible variations, strikes a familiar note with helicopter mechanics. I was impressed with my mechanic friend's knowledge and skill with helicopters, but from my observations and from other testing incidents related to me, this trial and error method appeared to be inaccurate, frustrating, dangerous and miserable duty during cold weather conditions.

Could a more accurate and less dangerous method be instituted? For FORSCOM, the answer is a resounding *yes*. A relatively inexpensive ($4,000 to $5,000) test equipment package known as the Vibrex System will do the job, and through QRIP it is currently in operation at a number of FORSCOM installations.

FORSCOM learned about the Vibrex System by sheer accident. One of our installation QRIP coordinators casually mentioned, while discussing another QRIP project, that someone had been trying to peddle some type of equipment to balance helicopter blades. I asked the coordinator to send me the literature on the equipment, and

Glossary

DCSCOMPT	Deputy Chief of Staff, Comptroller	NSN	national stock number
DCSLOG	Deputy Chief of Staff, Logistics	POC	point of contact
FORSCOM	Forces Command	QRIP	Quick Return on Investment Program
HQ	Headquarters	rpm	revolutions per minute
IPS	inches per second	TDA	table of distribution and allowances
MOS	military occupational specialty	TDY	temporary duty
MTDA	Modification Table of Distribution and Allowances	TOE	table of organization and equipment
MTOE	Modification Table of Organization and Equipment	TRADOC	Training and Doctrine Command
		TSARCOM	Troop Support and Aviation Materiel Readiness Command

he did. After evaluating the data on the equipment, we coincidentally received a QRIP project on this same system from another FORSCOM installation. We subsequently located an operational system and made an onsite evaluation.

The results were so favorable that we dispatched a letter from FORSCOM DCSCOMPT to all 22 FORSCOM installations describing the technical data and encouraging action under QRIP. Response was swift. To date we have received and approved 13 projects, totaling $64,000. These projects will save $170,000 annually, including a significant amount of test fuel. This equipment rapidly became so popular that the FORSCOM DCSLOG Readiness and Equipment Division gave the word to Department of the Army through TSARCOM. The system now is approved as an automatic issue item.

The Vibrex System will be issued to all TOE/MTOE and TDA/MTDA aviation units in accordance with the Department of the Army Master Priority List sequence in the following manner:

- One Vibrex Kit will be issued to all aviation unit maintenance activities with 10 or more aircraft.
- One Vibrex Kit will be issued to all aviation intermediate maintenance activities.
- TDA/MTDA aviation units will be issued one Vibrex Kit.

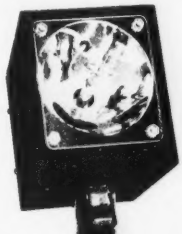
TRADOC will initiate a basis instruction for the Vibrex system to personnel in the 67/68 MOS series at the Aviation and Transportation Training Center, Ft. Eustis, VA. The New Equipment Training Team and field maintenance technician will train personnel using audiovisual aids, student hand-outs and a "Whirligig." The Whirligig, model 10, NSN 4920-01-015-4085 is a simulator for practicing tracking and balancing main and tailrotors. It can be set up to duplicate the operation of all helicopter configurations in the classroom. Use of the Whirligig allows personnel to become familiar with the controls and functions of the Vibrex System as well as proper use of balance charts.

Now let's explore some of the problems of track and balance helicopter rotors and then examine some solutions and benefits provided by the Vibrex System in real-life examples. Evidence, so far, validates the manufacturer's claims of the many benefits the system provides.

The basic problem is that helicopters vibrate (vertical, lateral, high frequency or combination) causing discomfort, impairing safety, shortening component and airframe life, and requiring excessive maintenance to keep things "patched up." Traditional trial and error methods have not, and cannot, adequately solve this problem because:

- Track cannot be measured in the air where it counts.
- Amplitude of vibration, and

1



Strobex Front View

2

3

1 Strobex blade tracker operates directly from helicopter's 28 volt d.c. power. 2 Reverse side of Strobex shows high intensity lamp. 3 Balancer-meter reads vibration amplitude in IPS. Phazor — "ring of lights" measures clock angle to determine where to make changes

Some Examples (Actual Field Runs) Are:

	Comments	Time
Case 1: Huey tailrotor: Ran ship at full revs—on the ground—and checked track. Looked OK. Since track looked good, a reading was made of vibration level while the ship was still running. It read about .15 IPS which is acceptable (less than .002 inches motion), so no further action was taken.	Any problem on this ship was not due to tailrotor track or balance.	20 min
Case 2: Hughes 296C main rotor (3 blade): The ship had a "built-in" lateral of .65 IPS, about which there had been complaints for a year. Two moves brought it to a smoothness (.05 IPS) never previously known.	A year of trial and error was solved in 1 hour.	55 min
Case 3: Hughes 296C tailrotor: Balanced tailrotor in three moves (from .7 IPS down to .1 IPS), but the pilot complained he was still "getting it in the back from that XXXX tailrotor." A pick-up was mounted in the cockpit and the balancer was dialed through a broad band of frequencies. This showed no measurable vibration at 3,100 rpm (tailrotor rate), but a very strong level at 5,800 rpm (twice engine rpm) which is the impulse (firing) rate of a 4 cycle/4 cylinder engine. This showed that the pilot was feeling engine vibration — not tailrotor.	The Balancer puts the blame where it belongs.	

the amount of weight required to fix it, can only be guessed at.

• Phase of vibration and the required location of weight cannot be judged at all.

• Frequency (rpm) of vibration, and thus the mechanical source, can only be guessed at.

The hit-and-miss approach now is obsolete. There will be no more flags. We'll no longer hear, "If it feels worse when I put the weight over here, I'll try it over there." Gone forever will be "the track is OK on the ground but the ship is sure rough at cruise." And the question "What will I do to which blade?" will likewise disappear.

There will be no more attempting to balance a tailrotor when the vibration was actually coming from the engine.

The solution: The Vibrex System (manufactured by the Chadwick-Helmuth Co., Inc., El Monte, CA (213) 575-6161) includes Strobex, Balance, Phazor and Charts for in-flight or on-the-ground tracking, dynamic balancing and positive identification of vibration rpm. Exact track and lead-lag can be seen through the entire flight profile high and low power, turns and autorotations. The balance equipment tells the amount and location of weight required to correct imbalance, and helps locate sources of vibration by accurate measurement of frequency. The Vibrex System:

• Gives track and lead-lag by visually displaying the rotor tip targets. This is accomplished through the use of a synchronized stroboscopic light, the Strobex.

• Electronically filters the vibration signal, accepting only the one-per-revolution of the rotor being worked.

• Reads vibration amplitude on a meter. This reading is proportional to the weight required to correct the balance.

• Shows the phase relation between the rotor and the motion of vibration (via Strobex observation or Phazor readout). This determines the location of the required weight (see paragraph above) by means of charts. (See figure above concerning actual field runs.)

Potential savings and benefits of this system are:

• Faster operational-ready aircraft.

• Time saved in tracking and balancing.

• Longer life of components.

• Savings in test fuel.

• Safety and comfort.

I strongly recommend that helicopter maintenance personnel investigate and evaluate the Vibrex System for applicability in their organizations. Your local supply channels should be aware that this system is an automatic issue item.

Some of the FORSCOM installations that now have Vibrex in operation or approved are: Forts Lewis, WA; Riley, KS; Stewart, GA; Hood, TX; Meade, MD; Polk, LA; and Bragg, NC.

Either in conjunction with Vibrex or separately, QRIP serves as a convenient means for fast funding of tools and equipment that will enhance the efficiency of your operation. Savings generated through QRIP projects may be reprogramed locally to other unfinanced requirements. This program has worked for FORSCOM. Procedures are outlined in chapter 5, AR 5-4.

The FORSCOM QRIP coordinator is Mr. Claud C. Ruthven, AV 588-2196. FORSCOM DCSLOG POC for the Vibrex System is Mr. Bill Shook, AV 588-2912.

The POCs at TSARCOM, Director of Materiel, are Mr. Robert Corno and COL Powell, AV 698-5831.

Happy tracking and balancing, and comfortable flying!

Grading of Warrant Officer Positions

Major Taylor C. Harvey
Warrant Officer Division
U. S. Army Military Personnel Center

IN THE PAST several years, numerous studies and proposals have been initiated on the "grading of warrant officer positions." In all cases, these studies have recommended that the present procedure of *not* grading warrant officer (WO) positions should be continued.

Current tables of organization and equipment and tables of distribution and allowances documents do not specify warrant officer grades. All warrant officer positions are specified for fill by a "WO" with no mention of grade and without specifying a requirement for a junior or senior warrant.

The significance of the grading question can best be understood by examining the primary reasons that have influenced the decision not to grade warrant officer positions.

Echelon Considerations. Warrant officers are appointed to meet Army requirements for particular skills and knowledge and are, by definition, highly skilled technicians who perform duty in relatively narrow fields of specialization. In many military occupational specialties (MOSs), they are expected to serve repetitively in assignments often at the same level of command. In these MOSs it's not unusual to find a WO who may spend an entire career at company level. In other career fields, WO positions are distributed at every level of command. Obviously, the inconsistencies that exist across the spectrum of WO MOSs make grading throughout the corps an extremely difficult task.

Assignment Considerations. The number of warrant officers in a specific MOS could cause the grading positions to be overly restrictive in the assignment options available. In low density career fields, MOS grading would tend to "shackle" the assignment system. A simple example is depicted in the figure.

This example illustrates how the number of personnel available for reassignment can be greatly reduced merely by associating a grade with a position. When added to other restrictions such as special qualification identifiers, language identification codes, additional skill identifiers, overseas assignment policies and permanent change of station constraints, grading would require personnel managers to use grade substitutions to fill vacancies. Extensive grade substitutions would completely defeat the purpose of grading as well as introduce morale problems associated with personnel assigned to improper grades.

Promotional Considerations. When positions are graded, good management practices and budgetary pressure dictate that only those personnel needed to fill vacancies are promoted. To promote more or less would cause surpluses and shortages which would have an adverse affect on personnel management. The absence of grading provides the flexibility the Army needs to provide equitable promotion opportunity for all warrant officers regardless of MOS, via a single promotion board. Promotions can be made on ability rather than on the availability or lack of availability of vacancies.

In summary, the current policy of not grading warrant officer positions assures full promotion potential, allows for assignment flexibility and provides a system than can adequately support personal considerations without conflicting with the force structure and command requirements.

	Personnel Assets	Vacancy	Assets Available to Fill Vacancy
Case 1	4 WOs (Grades 1 thru 4)	1 (ungraded)	4
Case 2	4 WOs (Grades 1 thru 4)	1 (WO1)	1

ATC ACTION LINE

UNITED STATES ARMY COMMUNICATIONS COMMAND

THE AIRMAN'S INFORMATION Manual, paragraphs 347g and h, refers to a published minimum holding altitude (MHA). MHAs are not usually charted. When a fix/facility is authorized for holding it is flight checked for performance. Minimum and maximum altitudes are specified. These are provided to the air traffic control (ATC) facility which has airspace responsibility and aircraft movement control for that fix/facility. Unless otherwise noted on en route charts/instrument procedures, the minimum en route IFR altitude (MEAs), procedure turn altitudes and specified feeder route altitudes constitute the MHA. MHAs by definition provide navigational reception and obstruction clearance for the airspace involved.

In the relationship between holding patterns and instrument approach procedures, the following principals should be applied. When a holding pattern is required in lieu of a procedure turn, this aspect constitutes a part of the instrument procedure. All associated notes/altitudes must be observed. When the holding pattern is not part of the instrument procedure, it should be considered separately. If holding on a feeder fix and then cleared for the approach, the holding altitude should be maintained until departing the fix. After departing, the published feeder routes and altitudes must be adhered to unless changed by ATC. The same holds true for the en route environment.

Another item of operational interest is the reporting of operational data for airfields with National Guard or Army Reserve units in a tenant status. Information pertaining to the civil airfield facilities is the responsibility of the airport manager who should report changes to the nearest flight service station (FSS). The FSS passes on pertinent items to the national flight data center which in turn selects data to be published as civil information systems in the DOD FLIP. This does not preclude the military tenant from monitoring and noting significant civil facility status items (publishable in the FLIP) and advising the airport manager as appropriate.

Now for the other (military) side of the field. Reporting pertinent changes to operational data generated in the accomplishment of the military mission is the responsibility of the National Guard or U. S. Army Reserve flight operations staff. Military data changes should be transmitted to the Director USAATCA-ASO per instructions in the FLIP foreword section.

VIEWS

Continued from page 31

Editor:

Would you please send me information concerning a subscription to your ***Aviation Digest***?

Is this ***Digest*** available to military personnel only or would civilian subscriptions be accepted?

I would appreciate any help and information.

Thanks for your trouble.

Mike Huhn
5540 Maze Pl.
St. Louis, MO 63116

• Military personnel obtain the magazine by submitting DA Form 12-5 through military channels. As a civilian, you can get the *Aviation Digest* through subscription. Send your remittance of $17.00 to the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402 for an annual subscription.

Editor:

Reference is made to ***Aviation Digest***, April 1979, page 47, photograph of M107. Super magazine, folks; but, the M107 is a 175 mm gun. You should change the tube on yours since you are 2 mm oversize.

Victorian C. Le Vesque
USA Logistic Assistance Office
Ft. Carson, CO 80913

• You are absolutely right. The caption should have read 175 mm.

Editor:

On 15 June 1979 my son-in-law, Mr. Bruce Jenkins, was fatally injured in a tractor accident at Victoria, Texas. His father is a retired Army aviator, COL William Jenkins, retired 1978.

In discussions with COL and Mrs. Jenkins, they expressed a desire to let their many aviation friends know about their son. They asked me specifically to contact ***Aviation Digest***. If you could do this it would be greatly appreciated. Details are:

Bruce H. Jenkins
Age: 28
Home: Victoria, Texas
Parents' Address: Bandera, Texas
Survived by: His parents, COL (Ret) and Mrs. William Jenkins, sister, Julie, and brother, Keith. Wife: Deborah Wurman Jenkins and son Jon Bradford Jenkins.

Very respectfully,
James W. Wurman
COL, FA
Ft. Sill, OK 73503

You, The News Media And Aircraft Accidents

Active duty, National Guard and Reserve component personnel have certain responsibilities when dealing with the news media at sites of aircraft accidents or incidents. The following article was prepared by the Office of Public Affairs at the U.S. Army Aviation Center, Ft. Rucker, AL to outline these matters.

RELEASE AUTHORITY

The public affairs officer (PAO) is the *sole* release authority for information related to aircraft accidents. All queries from news media representatives concerning details of accidents must be referred to the PAO who is the spokesperson for the command concerning accidents that occur either on Government property or in the civilian domain. Personnel at the accident site will refer all media queries to PAO.

ACCIDENTS OCCURRING ON FEDERAL PROPERTY

Upon arrival at the scene, the PAO (or PAO representative) assumes full responsibility for news media activities. When an accident or incident occurs in areas of Government jurisdiction (or on Federal property) and a PAO representative is not present to assume responsibility, personnel at the scene (crash rescue, medical, security guards, etc.) will within the bounds of legal safety requirements, *make no attempt to prevent news media representatives from photographing the scene of the accident/incident.* However, *should classified material be present, all media representatives will be restricted from the area until such time as classified materials have been secured.* When classified materials are not present, personnel should assist news media representatives in securing photographs they desire.

ACCIDENTS OCCURRING IN THE CIVILIAN DOMAIN

When accidents or incidents occur in the civilian domain, Army representatives, civilian or military, cannot assume jurisdiction. If the PAO representative is not present, personnel at the scene (crash rescue, medical, security guards, etc.) representing the Army's interests will within the bounds of legal safety requirements not attempt to prevent news media representatives from photographing the scene of the accident/incident. *Again, if classified material is present, news media representatives should be informed that photographing classified material is in violation of Federal Statutes (Title 18, U.S. Code 795, 797).* When classified material is not present, personnel should assist news media representatives in securing photographs they desire.

NEWS MEDIA QUERIES

Personnel must refer all requests for information (number of personnel aboard, medical condition, cause of accident, etc.) to the PAO who will coordinate all queries with appropriate staff agencies (Adjutant General Casualty, Safety, Hospital, etc.) before making any release to news media representatives.

Recommended for Bulletin Board

to prove the concept

Self-Deployment of Army Helicopters to Europe

The concept of self-deployment of Army aircraft to Europe, to include helicopters, has been around for a long time. Research indicates that in the early 1950s, two H-19 Chickasaw helicopters flew to Europe; however, the state of the art of navigational systems and range extension tanks were primitive at that time when compared to where we are today. This was followed by self-deployment of U-8 Seminoles (L-23s) which had crude internal ferry tanks. Today, the Army routinely flies OV-1 Mohawks, U-21 Utes and C-12 Hurons to and from Europe; but, to date there have been no major efforts to develop a self-deployment capability for our present and future fleet of Army helicopters.

The Army Aviation Systems Program Review (AAPR) 1978 established the requirements to develop this capability and gave Army aviation the challenge to prove the concept and provide the means. Efforts are now well underway to do exactly that with the UH-60 Black Hawk, AH-64 attack and CH-47 Chinook helicopters. The article on page 6 describes the efforts that have gone into development of the self-deployment capability for CH-47s. Thanks to the efforts of TRADOC (and especially the Transportation Center/School), DARCOM and FORSCOM, the Army now is moving ahead at a commendable rate — first with the CH-47C, and the UH-60 and AH-64 systems following.

The Army must develop this capability and I challenge the Army aviation community to lend its full support and personal involvement. Self-deployment of UH-60, AH-64 and CH-47 helicopters will then further enhance our flexibility, mobility and worldwide capability.

Carl H. McNair Jr.
Brigadier General

Note: General McNair was Deputy Director of Requirements and Army Aviation Officer, Office of the Deputy Chief of Staff for Operations and Plans, HQDA, when he wrote this introduction. He since has been reassigned as Deputy Commanding General, U. S. Army Aviation Center, Ft. Rucker, AL.